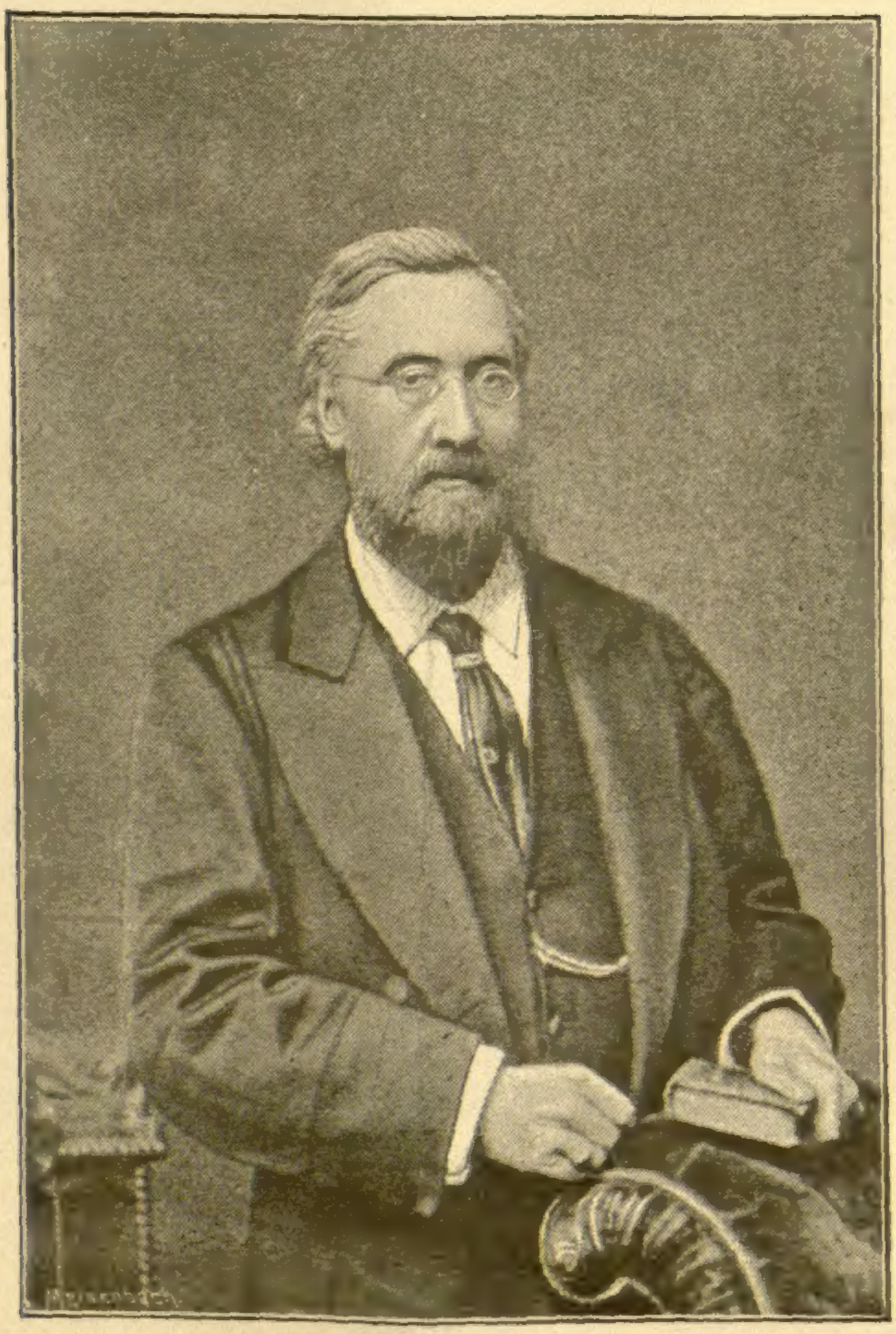

Sincerely Yours R. B. Hayes

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THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

Edited by

JAMES BRITTEN, F.L.S.,

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THE JOURNAL OF BOTANY

BRITISH AND FOREIGN.

HENRY FLETCHER HANCE.

(With Portrait).

Henry Fletcher Hance was born on August 4th, 1827, in Gloucester Terrace, Old Brompton, London, and spent much of his childhood in Devonshire. As regards this part of his life, I may quote his own words from a letter written to me in 1882, when I was living at Devonport:—"The address of your letter has brought back to me the memory of many happy days. Being a very delicate child, and London air being unsuited to me, I passed much of my earlier years under the roof of my maternal grandfather, Major Fletcher, R.M., in what was then a very good street, 20, Coburg Street, Plymouth (of which my dear mother was a native). I have always retained such a strong love for it and its beautiful neighbourhood that, when I was married in 1852 (thirty years ago! eheu Postume!), I selected it as the spot in which to pass my honeymoon.* It may interest you to know that my great-grandfather, Colonel Fletcher, R.M., who died when I was an infant, nearly blind and scarred with wounds received during a long and very active service, and who refused knighthood from that headstrong, obstinate, and withal well-intentioned monarch, George III., was indebted to the skill of an artillerist of the nascent republic for the loss of one of his calves, which was shot away at Bunker's Hill! . . . . At one time, when I was a child, I was sent with a most loving nurse to board at a farmhouse at Lipson, where I used to get up at daybreak and drink fresh milk from the cow. I can still see in memory the little diamond-latticed panes of my bedroom."

He appears to have been educated partly in London and partly on the Continent, but I have no definite information on this point.

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* Even then he did not altogether neglect his favourite pursuit. In his paper on "*Erica carnea* gathered in Devon" (Journ. Bot., 1867, p. 136), he says that, although "mainly occupied with matters unconnected with Botany . . . . in the month of June, 1852, I gathered, on a heath near Newton Abbot, an *Erica* which I determined at the time, &c."

Wherever his training was received, it resulted in making him a polished Latinist and a facile writer of French, while his knowledge of German certainly influenced his tone of scientific thought in after years.

On the 1st of September, 1844, when he was seventeen years of age, he entered the Civil Service of Hongkong, on the nomination of Sir John Davis, Governor of that Colony. In rather less than ten years he was transferred to the Superintendency of Trade in China, under the control of the Foreign Office, taking his place as 4th Assistant on May 1st, 1854. As his friend Sir Thomas Wade writes:—"His position was slightly, his prospects very much, improved by the transfer, which he owed to the recommendation of Sir John Bowring, who was always ready to bring forward any man connected with science or literature."

At the time of the disturbance arising from the attack on the lorcha 'Arrow,' which led to the second war with China, he was attached to the Canton Consulate as Senior Assistant under the late Sir Harry (then Mr.) Parkes, and, in the words of Sir Thomas Wade, "right well he worked" during the exciting period of the commencement of hostilities. In December, 1856, after the burning of the Foreign Factories at Canton, which cost him a serious loss of property, including books and botanical collections, he left for Hongkong. There he became Senior Assistant in the Superintendency, with the care of the archives, his experience in the work of this department securing him an appointment which he himself had in no way solicited.

In May, 1859, when the Superintendency was broken up by the establishment of H.M.'s Legation in China, Dr. Hance found, to his regret, that he had to go back to his post as Senior Assistant at Canton; but on March 26th, 1861, he was made Vice-Consul at Whampoa, a post about twelve miles further down the river. This position he held continuously for seventeen years, until the departure of the late Sir Brooke Robertson for home, when he took charge of the Canton Consulate from March, 1878, till November, 1879. In 1881 he was again Acting Consul at Canton from August to December, and he held the same appointment for a third time during Mr. Consul Hewlett's absence on sick leave from July 14th, 1883, till May 31st, 1885.

In September, 1883, serious riots occurred at Canton, and for some hours the English settlement on Shameen lay at the mercy of a Chinese mob. During this crisis, although some people thought that Dr. Hance might have assumed a stronger attitude, the general feeling was that he had exhibited no lack of those qualities which should distinguish a British official. Naturally, throughout this troubled period, his scientific work had to be suspended, and in January, 1884, he wrote me:—"Amidst the constant worry and anxiety of my daily life, I have been unable, except for a spare half-hour or so, to do anything at all botanically; but I hope, rather than expect, in a more or less proximate future, to get a little more time. I quite 'gave up' library and herbarium at the time of the irruption on Shameen! 'Inter arma silent

Musæ,' and I am afraid Britten will find my reed very voiceless this year."

Finally, after another return to his old post at Whampoa, he was appointed Acting Consul at Amoy in May of last year; but he had been there only for about a month when his sudden death, on June 22nd, closed his career of forty-two years' faithful service.

Dr. Hance was twice married, and leaves a widow and several children. His remains were taken to Hongkong, and buried, on June 26th, 1886, in the beautiful Wong-nei-chung Valley, the wooded slopes of which were the home of many a plant gathered or described by him during his lifetime.

It had been a matter of surprise to many of his friends, as it was a bitter disappointment to himself, that he never received permanent promotion to any post more important than that of the Whampoa Vice-Consulate. In fact, a suspicion had been engendered in the minds of some, who knew him only as a distinguished man of science, that his failure to rise in the service might be due to some question of personal character. Knowing myself the truth of the case, I feel it a duty to my friend's memory to have these unfounded suspicions publicly cleared up. And this I am glad to be able to do on the unimpeachable testimony of Sir Thomas Wade, K.C.B., who had known Dr. Hance for forty years, and who, as H.M.'s Minister Plenipotentiary at Peking, was for a long time his immediate chief.

Sir Thomas writes as follows:—"I became acquainted with Hance in 1846 or 1847, when he was a clerk in the Government offices at Hongkong, but it was not till after his transfer to the Superintendency, which, as you are aware, anteceded the Legation, that I came really to know the man. . . . . You appeal to me for an opinion of his merits as a public officer. It was very favourable. He was zealous, conscientious, and intelligent. I do not know that I ever met a man who seemed to me more constant in his endeavour to do his duty. He had the misfortune not to know Chinese. While he was in the Colonial service there was no inducement to him to study the language, and his leisure was devoted to his favourite pursuit, Botany. When he was transferred to the Foreign Office service, although not old, he was no longer young, and he was very hard worked. The Foreign Office rule, which made knowledge of Chinese indispensable, became justly and naturally more stringent every year, and by his unacquaintance with it he missed more than one opportunity of permanent advancement. He was employed provisionally as a Consul, and more than once; and, in my judgment, acquitted himself remarkably well in his acting capacity. . . . . Residing as I did in the north of China after 1860, I saw but little of him, but on the few occasions on which we met, I observed nothing to disturb the estimate I had earlier formed of his character, and which I have given you with more or less explicitness above."

According to a sympathetic notice of Dr. Hance in the 'China Mail' of June 26th, 1886, he took up Botany on his arrival in Hongkong in 1844, but his own letters to me state that he had

commenced the study, "self-taught," some five years before that. The following list of his earliest publications will show the scope of the work to which he at first devoted himself:—

1. "On some new Chinese plants." This paper (including descriptions of four new species) appeared in Hooker's 'London Journal of Botany,' vii. (1848), pp. 471–473, where the Editor speaks of him as "a gentleman resident in Hongkong, and who, we trust, will do much to advance our knowledge of Chinese Botany."

2. "On some Chinese plants."—Remarks on a proliferous leaf of *Chirita sinensis*.—Description of some new Acanthaceous plants. (Here he founded his first genus *Gutzlaffia*, now merged in *Strobilanthes*).—Description of a new *Cerastium*.—Hooker's 'Journal of Botany' i. (1849), pp. 141–143.

3. "Notes on new and little-known plants of China; *Synaedrys*, *Quercus*, and *Ipomæa*." Ibid., pp. 175–176.

4. "On the structure of the fruit in *Punica*." Henfrey's 'Botanical Gazette,' ii. (1850), pp. 280–283. This was afterwards summarised in Proc. Linn. Soc. ii. (1855), pp. 96–97.

5. A more important contribution was sent by him to Walper's 'Annales,' ii. (1851), the Editor of which, in a note on p. 3, says:—"Celeberrimus auctor benevole mecum communicavit dissertationem ineditam 'Plantarum novarum minusve cognitarum, præsertim Austro-Chinensium diagnoses, e speciminibus plerumque vivis descripsit Henr. F. Hance Ph. Dr.' ut eam in hoc altero Annalium tomo publici juris redderem." Parts of this paper, however, did not appear in print till the publication of the third volume of the 'Annales' (1852–53).

6. "Sketch of the Island and Flora of Hongkong, China." 'Phytologist' iv. (1853), pp. 881–891. This paper had been read before the Linnean Society, and Dr. Berthold Seemann, in communicating it, notes:—"This article, together with a considerable collection of Chinese plants, was given to me by my friend Dr. Hance to be freely employed in the Botany of H.M.S. 'Herald.'"

In the 'Annales des Sciences Naturelles' appeared the following papers:—

A. "Symbolæ ad Floram Sinicam adjectis paucissimarum stirpium japonicarum diagnosibus," Ser. 4, xv. (1861), pp. 220–230.

B. "Note sur deux espèces du genre *Scolopia*"; and "Manipulus plantarum novarum potissime Chinensium, &c," Ser. 4, xviii. (1863), pp. 214–238.

C. "Adversaria in Stirpes imprimis Asiæ Orientalis criticas minusve notas interjectis novarum plurimarum diagnosibus," Ser. 5, v. (1866), pp. 201–261. Published in separate form by Masson, Paris, in the same year.

Through the unwearied exertions of Dr. Hance himself and of others, accessions to our knowledge of the remarkable vegetation of Hongkong had accumulated so rapidly that, in 1871, he prepared a Supplement to Mr. Bentham's 'Flora Hongkongensis,' which had appeared in 1861. In this paper, published in the 'Journal of the Linnean Society,' Botany, xiii. (1873), pp. 95–144, 75 species were

enumerated beyond the 1003 species in Mr. Bentham's work, besides which Dr. Hance added many critical notes in elucidation or correction of previous records. The Supplement was dedicated to the memory of his friend Dr. Harland, late Colonial Surgeon of Hongkong, in whose honour he had already named the genus *Harlandia*, now merged in *Zehneria*.

Besides the Supplement to the 'Flora Hongkongensis,' the following short papers from his pen appeared in the 'Journal of the Linnean Society':—

"On the *Fagus castanea* Lour., with descriptions of two Chinese *Corylaceæ*" (Bot. x. 1869, pp. 199–203).

"On the Silkworm Oaks of Northern China" (Ibid. pp. 482–492).

"New species of *Archangelica* and *Pygeum* from the White Cloud Hills, Canton" (Bot. xi. 1871, pp. 454–455).

"On the source of the *Radix Galangæ minoris* of Pharmacologists" (Bot. xiii. 1873, pp. 1–7).

"Supplementary note on Chinese Silkworm Oaks" (Ibid. pp. 7–15).

"Note on some plants from Northern China" (Ibid. pp. 74–94).

But by far the greater portion of his work has been published in the pages of this Journal. From its commencement in 1863 he took a keen interest in its success, and he has, in fact, contributed more or less to every volume, with the single exception of the second.

In the number for January, 1878, he began a series of papers under the title "Spicilegia Floræ Sinensis: Diagnoses of new and habitats of rare or hitherto unrecorded Chinese plants," nine of which appeared during his lifetime. His rough notes for another, the last botanical work done by him, have been sent to me by Mrs. Hance, and will be found on another page of this number. The series thus prematurely closed comprises notices or descriptions of about 700 Chinese species, one of Dr. Hance's main objects being to elucidate phytogeographical points of interest. In May, 1881, he writes:—"You may have remarked that in my modest little 'Spicilegia' I usually content myself with pointing out the nearest localities which species not hitherto published as Chinese are known to inhabit. And the point I always bear in view is to show, contrary to Bentham's opinion,—expressed at a time when materials were very much more scanty than now, and quite justified by those materials,—that, whilst the flora of Eastern China from north to south has a close connection with that of the Eastern Himalayas, it has an almost equally close one with that of Japan, and therefore, by representative species and genera, with that of the Atlantic States of America."

Dr. Hance's work, as we have seen, was almost exclusively in systematic and descriptive Botany, but the ability he displayed, on the rarer occasions when he wrote upon economic plants, makes us almost regret that he did not devote more attention to that branch of the science. Three economic papers on "Chinese Silkworm Oaks" and "The source of the *Radix Galangæ minoris* of Pharma-

cologists" have already been cited from the 'Journals of the Linnean Society,' and the following have appeared in this Journal :—

"On the so-called Olives (*Canarii* spp.) of Southern China," 1871, p. 38.

"On the source of the China-root of Commerce," 1872, p. 102.

"On a Chinese culinary vegetable," 1872, p. 146.

"On the Ch'ing muh Hsiang or 'Green Putchuck' of the Chinese," 1873, p. 72.

"Uses of the common Rush in China," 1875, p. 106.

"On a Mongolian Grass producing intoxication in Cattle" (*Stipa inebrians*, n. sp.), 1876, p. 210.

"Supplementary note on intoxicating Grasses" (*Stipa pekinensis*, n. sp.), 1877, p. 267.

"On the source of the China Matting of Commerce," 1879, p. 99.

In addition to the above I know that he furnished notes from time to time to China newspapers and magazines, but I have unfortunately at the moment no access to files of these periodicals.

Dr. Hance's method of work must have been thorough and painstaking in the highest degree, and it bore worthy fruit, not only in the accuracy of his statements, but in a wealth of reference and illustration that was simply marvellous for an author in his isolated position. Moreover, the quaint and out-of-the-way sources from which he sometimes drew information show that, alongside of his passion for Botany, he cherished an ardent love of old books. This phase of his character sought expression now and then in such contributions to this Journal as his curious antiquarian "Note on Borage" (1879, p. 301), and his "Etymology of Vincetoxicum" (1883, p. 153), both of which interesting specimens I may commend to my readers for perusal.

He was eminently "laudator temporis acti," perhaps too much so, as he himself used to suggest. He prided himself on being a "purist," and a glance over his writings shows that he did not hesitate to act on his convictions in matters of botanical nomenclature. His own scrupulous accuracy made him somewhat impatient of mistakes by others, and printers' errors in his papers have, on occasion, drawn from him good-natured growls against successive Editors of this Journal! A few years ago, becoming convinced that the accepted system of Latin orthography was modern and wrong, he at once prepared his own manuscript accordingly. As I had offered my help in seeing his work through the press, he wrote to me on June 1st, 1883 :—"I am sending two papers, exclusively Latin, to Britten. Kindly read them carefully. If you notice any novelties in orthography, don't alter them.* I have recently gone through Brambach's excellent little 'Hülfsbüchlein,' and it is useless and wrong to persist in old unauthorised spellings. And these changes are all discussed and noticed, I find, in our best Latin Dictionary, Lewis and Short's, which, very curiously to my thinking, is American, since classical philology is or has been the weakest point of American scholarship."

* The Editor, however, declined to admit these "reversions."

It would be worse than presumption on my part to offer my own critical estimate of Dr. Hance's scientific work, and I cannot do better than quote Sir Joseph Hooker, who writes:—"With regard to Dr. Hance's botanical attainments and the value of his labours, I can speak in very high terms. For upwards of forty years he devoted all his spare time to investigating the vegetation of China, displaying rare ability in mastering the technicalities of structural and descriptive Botany, at the same time enriching the scientific journals in England with accounts of new plants of great interest in a botanical and economic point of view. In all that he attempted he aimed at critical accuracy in identification and diagnosis, and this he attained in an eminent degree, so that there is no possibility of failure in recognising from his descriptions the plants he had under examination. Had Dr. Hance lived he would doubtless have given in a connected form an account of the vegetable riches of China, such as it would have been far beyond the grasp of any other naturalist to have produced, and this, too, with a classical diction that is extremely rare in the writings of scientific men. As it is, he has left no successor in China."

Sir Joseph Hooker's concluding sentences suggest the question which has doubtless occurred to many botanists, of how it happened that Dr. Hance had never concentrated himself on a monograph of any considerable group of species. It may have been that, in his mind, the critical faculty was more developed than the constructive. Still, admitting this to the utmost, I feel very strongly that, had his lines been cast in other places, his works would have been a more enduring monument of his powers and erudition. And, in justice to him, I desire to lay some stress upon this view, which I think will be found to be justified by what follows.

It is hardly possible to exaggerate the loneliness of life at Whampoa for such a man as Dr. Hance. Outside of his own family, there were no foreigners save the constable of his Consulate and a few Customs' tidewaiters. Shipping had almost deserted the port, which was usually a scene of utter stagnation. Here was Dr. Hance's home for a quarter of a century, and indeed from 1844 till 1886, with the exception of one visit to England in 1852, his wanderings never extended beyond Amoy to the north or Saigon to the south. In such a spot, under most depressing climatic influences, and with very straitened means, he not only steadfastly pursued his scientific labours, but he took a living interest in the world's affairs, and kept his mind in the full stream of modern thought and literature. That he should have accomplished so much, under discouraging conditions that would have broken the spirit of most men, surely proves that he was endowed with mental and moral fibre of no common quality.

His Herbarium, which, under the provisions of his will, has lately been offered to the British Museum, contained, at the time of his death, over 22,000 different species or varieties. His specimens had all been poisoned and mounted by his own hands, and were carefully arranged according to the latest authorities.

He often refers in his letters to the time and labour involved in the care of such a large collection, and, as an instance, I may quote from that of October 30th, 1873. Although he writes that he is far from well, he says:—"I am overwhelmed with botanical work. I have just got the second volume, part I., of the 'Genera,' extending to the end of *Compositæ*, and I must at once set to and arrange my own herbarium so far by it. . . . . Yesterday I took the entire day to do the *Caprifoliaceæ*, and I dare say two months will not cover all my work. It is a heavy task."

His scientific correspondence was probably more extended and more voluminous than would have been necessary for him in Europe. For in this way alone could he hope to keep touch with the movement of his time, deprived, as he was, for long weeks together of the society of educated men, and wholly shut off from personal intercourse with other botanists. And, taking that part of his correspondence which must have been tedious at best, and often aggravating, I doubt if any man ever exerted himself more conscientiously to give the earliest and fullest possible answer on matters submitted to him. I have before me his letter of August 8th, 1874, when, as he wrote, the thermometer was at 90°, and he was busy over an important collection of plants. Yet he found time to reply at length to a question of mine, which, I fear, was of the aggravating kind, at what cost to himself may be inferred from his concluding words. "It is 11 o'clock, and with the exception of half an hour for my two slender meals, I have been at work without cessation since 6 a.m.; so I am tired, and must go to by-by."

Another cause of interruption to consecutive work was the constant stream of specimens sent from various parts of China, which he felt it a duty to determine as soon as possible, and without much regard for his own convenience. As he had no assistant for herbarium work, the mere sorting and manipulation of these specimens entailed an expenditure of time which, for a man of his calibre, must be regarded as actual waste. Furthermore, while in earlier years the plants generally belonged to districts with the flora of which he was familiar, the amount of fresh material that came in, as the area of exploration was expanded, made the task of identification much more laborious. Later on, he seems to have experienced a new difficulty, as the growth of his herbarium extended his own knowledge of plants far beyond the limits of Eastern Asia. On November 6th, 1881, he writes me from Canton—"Here I can do nothing, as plants and books are away, and the fact is I have got to deal with so many thousand species from all parts of the world, that I have really lost the power I once, to some extent, possessed of naming specifically Chinese plants without careful preliminary comparison."

But, after all, the chief reason for his rather desultory scientific work must be sought in the nervous depression, physical weakness, and disease which resulted from his prolonged residence in the steaming atmosphere of tropical rice-fields. According to his own account, he was delicate as a child, and reaching Hongkong at an

age when his constitution was hardly formed, he had for years no opportunity to recruit by change to a more bracing climate. There was no physician at Whampoa, and while there Dr. Hance was forced not only to prescribe, but often to compound, medicines for himself and his family. He writes of this in August, 1880, when, with his two youngest children near the point of death, he had had all the anxiety of treating them, whilst suffering himself from severe remittent fever and touches of delirium. And yet, in the midst of all this, he speaks of re-arranging the *Incompletæ* and *Gymnospermæ* of his herbarium according to the new volume of the 'Genera!'

From the beginning of my correspondence with him in 1869, he had frequently mentioned the interruption of his work by illness, but from 1880 onwards his pathetic allusions to failing health became almost incessant. I cannot refrain from quoting a few of these passages, for they give a most touching picture of his agony of mind and body. On December 22nd, 1880, he writes from Whampoa:—"I have been terribly held back from writing by sickness and anxieties of one kind and another, and this place really seems to have got transformed into a fever nest. This year's 'Journal of Botany' scarcely contains anything of mine, and in a country where there is so much novelty I should like to do twice as much as I do. Indeed I think it is a duty, when one has the materials and the knowledge." Again, on January 26th, 1881, he says:—"I feel, alas! that my days of active work are quietly and steadily closing in. This is my thirty-sixth year in China, and I have neither the hand nor head that I possessed ten years ago. But I shall never cease my love for my favourite science, and shall always, as you know I am sure, be glad to give you any opinion or advice you may think it worth while to ask of me." Then on August 1st, 1882, comes this despairing moan from Whampoa:—"I am sick, aging, ill-disposed, and too often unequal to any work. I do not think I can stay here much longer, or be of any use to science."

Fevers, congestion of the liver, and other serious complications, sapped his strength and robbed him of working hours more and more in each successive year. In the summer of 1884, when he had been almost at the last extremity, he was moved to a government pavilion on the Peak at Hong-Kong,* but unfortunately at this juncture the Oriental Bank suspended payment. As every sixpence he had in the world was lodged there, his embarrassment left him no alternative but to resume his duties as Acting Consul at Canton. A year later he was threatened with apoplexy, and was ordered to Macao for three months' absolute rest. He seems to have derived some benefit from this change, as on December 13th, 1885, he writes from Whampoa in better spirits. It may, however, be doubted whether the relief was more than temporary,

* Here he was attended by Dr. Manson (well known in Europe for his researches on the blood filaria), of whose kindness and professional ability he writes in the warmest terms.

but I cannot speak with certainty, as I never heard from him again.

Enough has been said to indicate how undaunted was the spirit, and how earnest the purpose, that animated Dr. Hance's frail body. But there were also in his character traits of almost womanly tenderness, that were perhaps unsuspected save by his more intimate friends. With all the courage of his matured opinions, he was chivalrous, even to Quixotism, in their expression, and shrank from saying or doing anything that might possibly be construed as the outcome of jealousy or spite. For instance, I once asked him, on behalf of the Council of the China branch of the Royal Asiatic Society, for a confidential opinion on a botanical paper which had been submitted to us. He gave it, but only with the greatest reluctance, and, while admitting that we had an unquestionable right to call for his advice, as a corresponding member, he said afterwards:—"But I really felt as if I had done an *underhand* thing, since it was not an open criticism but a private opinion I gave. . . . In fact, I would rather give a *formal* opinion to the Council, to show that I was candid and honest, and they might do what they chose with it." No wonder that such a man should write on another occasion:—"Thank Heaven, I have always been able to keep clear of *cliques*, and to criticise any one, regardless of his influence or reputation;" and again, "I personally cannot comprehend how it is that men, actuated by a common love for and study of science, should cherish petty jealousies and resentments."

To those residents in China, who had been accustomed to look to Dr. Hance for botanical advice and encouragement, his death is an irreparable loss. Genial in his flow of conversation, he was ever ready to draw upon his almost encyclopædic stores of knowledge for the benefit of those about him. He was equally ready to afford information to others at a distance, more especially if he found in them, or had himself imbued them with, an interest in his own favourite science.

When, in 1869, I sent him a letter of introduction, with an inquiry how I might best take up the study of plants, I received a reply of fourteen closely-written pages, filled with most valuable hints as to books and methods of work. In concluding his letter, he says:—"When I remember how glad I should have been, on my arrival in Hongkong in 1844, when the botany of Asia was much less known and studied, for the help of some friendly hand, I feel it as much a duty as a pleasure to reply to such invitations as yours. I have written with a freedom and unreserve for which I ought perhaps to apologize, as I have not the pleasure of knowing you personally, but I trust the sort of natural freemasony amongst the common cultivators of a science will be my sufficient excuse."

On more than one occasion afterwards, in response to questions about special books, he not only furnished me with the desired information, but would add a critical review of the whole literature of the subject. Indeed his fixed idea seems to have been that, as the only professed botanist in China, it behoved him to encourage others to collect and study the plants of that Empire, at any sacrifice

of his own *études de prédilection*. His family crest was a bear, below the words "Ferox ut," but his own character would have been more fitly symbolized by an outstretched hand, with the motto "Noblesse oblige."

During the course of his life Dr. Hance had received many scientific honours. In the 'China Mail' it is stated that he graduated as Philosophiæ Doctor on November 24th, 1849, but, as he was then in China, the degree must have been honorary. I have been unable to ascertain from what university it was derived; nor do the archives of the Linnean Society, which Dr. Murie has kindly consulted, give any information as to his Alma Mater. In September, 1877, he writes:—"I have been elected a member of the Imp. Leopoldino-Carolina Acad. Naturæ Curiosorum, one of the oldest scientific institutions in Germany, and this is an honour I really prize very highly, as it is conferred but sparingly, and Prof. A. Braun, of Berlin, Grisebach of Göttingen, and Pringsheim of Berlin, were my unsolicited proposers. I have also been elected a member of the old "Essex Institute" of Salem, which you must know well by reputation, and of the Soc. Royale de Botanique de Belgique." He was also a fellow of the Linnean Society of London, of the Royal Botanic Society of Ratisbon, of the Imperial-Royal Zoological and Botanical Society of Vienna, of the Imperial-Royal Geological Institute of Austria, and a corresponding member of the China Branch of the Royal Asiatic Society.

His name was commemorated by Dr. Berthold Seemann in the genus *Hancea*, which, however, has since been merged in *Mallotus*.

In the above sketch my own letters from Dr. Hance have furnished much of my material. Although I never met him, except in 1874 during a visit of two days at his house, we seemed in the course of years to draw very close together, and on my departure from China, in 1882, he kindly wrote that he felt he was losing one of his most intimate friends. We corresponded in the most sympathetic and unreserved way, and I have not hesitated, where it has been possible, to quote freely from his letters, for they often afford the best means of bringing his personality into clear relief.

The score of his life had been written by Providence in a minor key throughout, and this narrative can hardly be read without some of the sadness which I have felt in preparing it. I can only regret that my record has, of necessity, been far from complete, but, inadequate as I feel this tribute to be, I offer it in loving and reverent memory of my departed friend.

FRANCIS BLACKWELL FORBES.

Paris, December 13th, 1886.

SPICILEGIA FLORÆ SINENSIS: DIAGNOSES OF NEW, AND HABITATS OF RARE OR HITHERTO UNRECORDED, CHINESE PLANTS.

By the late H. F. Hance, Ph.D., Memb. Acad. Nat. Cur., &c.

X.

[Some rough memoranda for another number of the "Spicilegia" have just been sent to me by Mrs. Hance, with a request that the last botanical work of her late husband should be published in this Journal. I have scrupulously copied my lamented friend's manuscript, save where I have found obvious slips of his usually accurate pen. I have also completed the references indicated by him, and have added a few others in notes.—F. B. Forbes.]

1. *Silene* (*Conomorpha*) *conoidea* L. — In collinis circa Foochow, prov. Fokien, a. 1883, coll. W. R. Carles.*

2. *Pileostegia viburnoides* Hook. f. & Thoms. — In jugo Lo-fau-shan, prov. Cantonensis, m. Aug. 1883, legit C. Ford. Not before met with in South China, but gathered by Dr. von Möllendorff at Kiukiang.

3. *Lagerstræmia microcarpa* Wight. — Circa Ki-lung Formosæ septentrionalis, Junio 1884, leg. C. Ford. Previously found in Kwangtung by Mr. Sampson (Journ. Bot. 1878, p. 107.

4. *Inula* (*Bubonium*) *Britannica* L. — Ad ripas limosas fluvii Cantonensis, juxta urbem, m. Aug. 1885, coll. T. Sampson. This variable and widely diffused species occurs abundantly throughout the whole of North-Eastern Asia and in Japan, but this is its first record from the extreme South of China. It is singular that, though met with on the Tian-shan Mountains, it has not hitherto, I believe, been detected in any part of India.

5. *Symplocos* (*Hopea*, *Lodhra*) *neriifolia* S. & Z. — Ad Ki-lung, Formosæ septentrionalis, Jun. 1884, leg. C. Ford. I do not know whether this has been before recorded out of Japan, where it is, I believe, rather uncommon.†

6. *Linociera* (*Ceranthus*) *Cambodiana* Hance. — Ad pagum Wo-chi, jurisdictionis Lam-ko, ins. Hainan, d. 1 Nov., legit rev. B. C. Henry. The inflorescence is less tomentose than in the Cambodian specimens, and the leaves are usually irregularly dentate; but I find no other differences.

7. *Monochasma Savatieri* Franch. — In collinis circa Foochow, prov. Fokien, æst. 1883, coll. W. R. Carles.

8. *Gomphostemma chinense* Oliv. — In Ins. Hainan, ad pagum Fau-lun, territorii indigenarum Lai dictorum, d. 15 Nov. 1882, legit rev. B. C. Henry. The colour of the flowers is white, according to the collector.

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* Recorded in the 'Index Floræ Sinensis' only from Shensi, in North-Western China.—F. B. F.

† Recorded from Liuchu Archipelago in Engler. Bot. Jahrb. vi. 65.—F. B. F.

9. *Pilea muscosa* Lindl.—Macaii, ad rupes, copiose, Sept. 1885, ipse legi. Perfectly naturalized, as it has also become in parts of Hongkong.*

10. *Quercus* (*Pasania*) *Irwinii* Hance. — In monte Tai-mo-shan, adversus Hongkong, arbori unicæ fructiferæ, et ut videbatur emorituræ, obviam factus cl. A. B. Westland, sub initio Aprilis 1885. The few ripe fruits collected by Mr. Westland enabled me to complete the original diagnosis, drawn up from the only live specimens I have ever seen, the acorns of which were immature:— Fructibus dense fasciculatis, cupulæ crateriformis squamis ovatis apiculo calloso inflexo cinereo-tomentosis glande matura depresso-hemisphærica levi cupulam triplo superante 9 lin. diametro.

Belongs to the group of which *Q. spicata* Sm. may be considered the type, and is closely allied to that species.†

11. *Quercus* (*Chlamydobalanus*) *cuspidata* Thbg. — In montibus Pakwan, supra Cantonem, m. Nov. 1885, copiose crescentem invenit pedisequus sinicus amici T. Sampson. A very notable accession to the Canton flora, the species having hitherto been only certainly known from Japan and Korea, for, as I have before observed (Journ. Bot. 1885, p. 366), I suspect A. DeCandolle's var. *sinensis* is referable to *Q. sclerophylla* Lindl.

12. *Podocarpus* (*Eupodocarpus*) *macrophylla* Don. — Juxta Ki-lung. Formosæ septentrionalis m. Jun. 1884, legit C. Ford.‡

13. *Podocarpus* (*Eupodocarpus*) *argotænia* Hance. — In monte Tai-mo-shan, prope Hongkong, d. 26 Apr. 1885, specimina mascula florida invenit cl. A. B. Westland. Inflorescentiæ masculæ geminatæ. Flores in glomerulos distinctos plus minus remotos secus rachin dispositi. This very interesting species is at once distinguishable from its allies by the interruptedly spicate arrangement of the male flowers. The female inflorescence is as yet unknown.

14. *Anæctochilus Roxburghii* Lindl.—In jugo Lo-fau-shan, prov. Cantonensis, a. 1883, legit C. Ford. A magnificent pot of this, in full flower, which Mr. Ford was so kind as to send me for examination, leaves no doubt of its identity; and I find the Ningpo plant (Journ. Bot. 1882, p. 39) is the same, though less robust, no doubt on account of its more northerly habitat.

15. *Disporum sessile* Don. — In monte Tai-mo-shan, adversus Hongkong, m. Aprili 1885, legit A. B. Westland. Recorded before (Journ. Bot. 1883, p. 358) from Chekiang, but now first found in Kwangtung.

16. *Disporum Leschenaultianum* Don.?—Infra desilientem aquam, ad fauces Siu-tin-mun, jugi Lo-fau-shan, prov. Cantonensis, alt. 2800 ped., m. Maio 1883, fructu immaturo tantum præditum legit rev. B. C. Henry. This agrees very well with Baker's diagnosis and with Wight's figures, but I have never seen authentic specimens

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* This appears to be the first record of this species from China.—F. B. F.

† Originally described by Dr. Hance in Ann. Sc. Nat. Paris, Ser. 4, Tom. xviii. p. 229, from a specimen gathered in the Wongneichung Valley, Hong kong.—F. B. F.

‡ Previously recorded from Yunnan by Kurz in Journ. Bot. 1873, p. 193. — F. B. F.

of the Indian and Ceylon plant. The stem is closed at its base and in its lower half by 3–4 conspicuous lanceolate scarious scales or phyllodia, about three inches in length, and the leaves are of a firmer more pergameous texture than in the others I am acquainted with. If not really referable to Don's species, it is undoubtedly new.

17. *Asplenium Griffithianum* Hook. — In monte Tai-mo-shan, adversus Hongkong, exeunte Apr. 1885, legit A. B. Westland. A native of the Himalayas, Mishmi, the Mountains of Bengal and Tennaserim, but now first recorded from China.

18. *Gymnogramme Griffithii* Baker, var. *pinnatifida*. — Ad Foochow, Maio 1857, legit W. Gregory. In monte Tai-mo-shan, adversus Hongkong, exeunte versus finem Apr. 1885, detexit A. B. Westland. Only, I believe, hitherto known from the Bengal Mountains and Formosa. I cite Mr. Baker as sponsor under the above name, on the authority of Salomon (Nomencl. d. Gefässkrypt. 184), but in the 'Synopsis Filicum' it is retained under *Hemionitis*. But looking at the very heterogeneous assemblage of species collected under the name of *Gymnogramme* in that work, some, as I consider them, belonging to *Polypodium*, some to *Aspidium*, and others forming genera *sui juris*, it is tolerably clear that *Hemionitis*, as the late Sir W. Hooker and Mr. Baker limit it, has a better claim to be included than many species which have been admitted without question into this unnatural congregation. Mettenius in his unpublished MSS., Trevisan, and especially Max. Kuhn (Die Gruppe d. Cheiropterides), have greatly modified (and, it may be added, considerably confused) the limits of either the tribe *Gymnogrammeæ* or of its genera: but there can be little doubt that a patient study of both *Gymnogrammeæ* and *Acrosticheæ* will lead to considerable changes. The species under discussion and its immediate allies, though previously referred to *Gymnogramme* by Kuhn, are now excluded by him from the tribe even.

19. *Acrostichum conforme* Swz. — In monte Tai-mo-shan, adversus ins. Hongkong, m. Sept. 1885, leg. A. B. Westland. A widely distributed fern, not previously, I believe, recorded from China.

NOTES ON THE FLORA OF MIDDLESEX.

By John Benbow, F.L.S.

The following notes embody the results of a series of rambles through Middlesex last autumn.

Only those species, however, stated to be rare in Messrs. Trimen and Dyer's 'Flora,' and gathered in stations not given in that work, are included in the list.

The excursion, it must be confessed, did not yield the unqualified pleasure anticipated, for it disclosed to me more clearly than ever the fact that one half of the county is a vast cabbage-garden, and the other a huge building-plot, wherein the ubiquitous builder is continually encroaching on habitats once thought to be far out of reach.

It proved, too, that drainage is gradually drying up the homes of our marsh-plants, and that the old moors and commons have been largely converted into luxuriant meadows; that pools and water-courses—the favourite haunts of so many of our less common species—are being everywhere filled up; and that brooks and streams are now merely conduits for adjacent towns and villages to drain into, not only to the destruction of the water-plants, but forbidding even an approach towards the malodorous banks.

Nor has the limited chalk district in the extreme north escaped the general deterioration. Improved farming, with its new system of cropping, has almost entirely exterminated the species characteristic of the soil.

In short, after visiting all the districts into which the county is botanically divided, the conclusion forced upon me was, that the Flora of Middlesex is in evil case, and in fair way of being ultimately stamped out; or at least that it will have to be sought for in the near future in the lanes and back-gardens of our countless suburbs.

A considerable number of the stations recording the rarer species, and still retained in Messrs. Trimen and Dyer's work, were found to be blank, and though possibly, in a few instances, the plants may have been overlooked, it is scarcely probable that the majority could have escaped notice. In one or two instances plants were found in stations supposed to be lost, but on the whole I found that the authors of the 'Flora' and others had made an exhaustive search, and left little to be gleaned by those who follow in their steps.

Fumaria micrantha was found to be not at all an uncommon plant in districts 2 and 3; in many places abundant, as about Harmondsworth, Halliford, between Hanworth and Twickenham, &c., but *F. pallidiflora* and *F. muralis* were not observed in any district.

Stellaria glauca. Youveney. Staines Common.

Cerastium arvense I could not find in any of the recorded stations.

Geranium pratense. In plenty on bank of bridge over South-Western Railway at Youveney.

Erodium cicutarium. Uxbridge Common. Ickenham Green. Norwood. Stonebridge. Between Whitton and Hounslow.

Linum catharticum. About Harefield. Ruislip. Northwood. Grand Junction Canal, between Denham and Jack's Lock. Whettone. Near Warren Gate.

Impatiens parviflora is rapidly spreading in fields and cultivated ground between Hanworth and Twickenham.

Rhamnus catharticus. Plentiful in the green lane between Cowley and Hillingdon, and between Hampton Court and Kingston Bridge.—*R. Frangula*. Coppet's Wood. Muswell Hill.

Genista tinctoria. Northwood. Meadow by Bayhurst Wood, Ruislip.

Medicago denticulata. Between Hounslow and Chase Bridge. Between Whitton and Isleworth.—Var. *apiculata*. By the Duke's River, near Worton.

Trifolium arvense. Side of South-Western Railway at Youveney. Between Shepperton and Walton Bridge. In great plenty in a road and meadow between Sunbury and Hampton.

Sanguisorba officinalis. Very abundant in a meadow at Kenton. Frequent about Edgeware, &c.

Rosa villosa. Hedges about Harrow (doubtless Mr. Hind's station).—*R. micrantha.* A small bush in the stone wall of Thames bank, nearly opposite Thames Ditton.—*R. rubiginosa.* Meadow near Northwood.

Epilobium macrocarpum. By a ditch in waste ground near Hounslow Heath. Mims Wood. Enfield Churchyard.

Myriophyllum verticillatum. Staines Common. Ponds on Staines Moor, abundant.

Hippuris vulgaris. Bushy Park. Abundant in the valley of the Colne and Grand Junction Canal.

Pimpinella magna. Abundant in meadows between Barnet and Hadley Common, and Cocks Forster. (Probably Mr. Newbould's station).

Sium latifolium I was not fortunate enough to discover in any part of the Thames.

Œnanthe Phellandrium. Staines Common. Pool by Woodfield House, near Kingsbury Reservoir. *Œ. silaifolia* of Mr. Farrar, in the pool near Woodfield House, I found to be only the above (*Œ. Phellandrium*). As the Greenford plant turned out to be *Œ. crocata*, this species has not yet been shown to be a native of Middlesex. I also carefully searched Mr. H. C. Watson's stations for *Œ. Lachenalii* without result; but as the ditches had evidently been cleaned out, it may possibly be still existent.

Chærophyllum Anthriscus. Road by Uxbridge Common, opposite entrance to Warren Farm; the only spot where I have noticed it in Middlesex.

Galium Cruciata. Youveney. Staines. Ashford Common. Charlton. Near Hadley Common. Between North and South Mims. Near Warren Gate.

Valerianella carinata. Very abundant on banks of railroad between Uxbridge and West Drayton, near the Greenway bridge.

Petasites vulgaris, said to be "remarkably scarce in the county," is remarkably abundant throughout the Colne Valley, from Uxbridge to near Rickmansworth.

Erigeron acris is more widely distributed than even *E. canadensis.* I gathered it last autumn about Uxbridge, West Drayton, Staines, Laleham, Feltham, Hampton, Sunbury, and between Hadley and Potter's Bar.

Solidago Virgaurea. Meadow near Stanmore Heath. Between Enfield and Trent Park.

Pulicaria vulgaris. Shortwood Common and Knowle Green, Staines, in plenty.

Anthemis arvensis. Uxbridge Common.

Chrysanthemum segetum. Sipson. Whitton. Feltham. Halliford. Hadley.

Filago minima. Abundant in a field near Ashford Common;

a single plant near Fulwell Station.—*F. spatulata* I cannot find in any of the stations recorded for it, but it grows on the Surrey bank of the Thames, nearly opposite Strawberry Hill.

Carlina vulgaris. A few plants on Finchley Common, the only habitat known to me in Middlesex. It is abundant and very fine in a meadow near Warren Gate, just beyond our boundary.

The station for *Centaurea Jacea* is apparently lost, the Goods Yard of the South-Western Railway now covering the spot. One of the workmen informed me that the last plants of a knapweed were gathered by a gentleman, as he was levelling the ground about four years ago.

Carduus crispus has been evidently overlooked in District 6, though extremely abundant in the Lea valley from Ponder's End to Waltham Abbey.

Crepis taraxacifolia was again plentiful between Hampton Court and Kingston Bridge; nearer the former this year.

Hieracium murorum. On the old monastery wall by West Drayton Church. (*H. vulgatum* (apparently) on the lofty walls of the churchyard).—*H. boreale* is quite a common species, especially in the northern districts about Hadley, Barnet, Potter's Bar, Enfield Chase, &c.—*H. umbellatum* is a much rarer species in Middlesex, and except in places already recorded I met with it only on the railway banks between Hounslow and Feltham, and in a copse between Enfield and Potter's Bar.

Campanula glomerata grows plentifully on a wide piece of turf, at a bend of the Thames between Staines Bridge and Laleham. A single plant under the wall of Hampton Court (river side), and another by the roadside between Sunbury and Walton Bridge.—*C. latifolia* I did not notice in the chalk-pit at Warren Gate.

Lycopsis arvensis. In a field close to Shepperton Station.

Echium vulgare. A single plant on Uxbridge Moor.

Myosotis repens I have never been able to find at Ruislip Reservoir. Is it possible Mr. Hind could have mistaken a plant of *M. cæspitosa* for it?

Verbascum nigrum. A single plant near Norwood.

Antirrhinum Orontium. About Hanworth, Feltham, Twickenham, Ashford, Charlton. Near Walton Bridge.

Linaria Elatine. Uxbridge. Ickenham. Northwood. Harefield. West Drayton. Staines.—*L. spuria.* Uxbridge. Harefield. Colnbrook. Stanwell Moor. Staines. Between Shepperton and Walton Bridge. — *L. minor* is frequent in District 1 in the stations given above; in fact all three species appear to be more frequent in this district than elsewhere.

Limosella aquatica is not near the pond at Breakspeares nor on Harefield Common. At Elstree and North Mims it seems to be out of bounds, and in none of the other places indicated have I noticed it.

Pedicularis palustris. Cowley. Youveney. Staines Moor. Drayton Ford.

Euphrasia officinalis. Botany Bay. Enfield Chase. Near Warren Gate.

Mentha rotundifolia is not in Harefield Churchyard, and Sole's record for *M. sylvestris* var. *nemorosa* at Hillingdon, and still retained in the 'Flora,' is surely a little antiquated!—*M. rubra* is not in the pond at Breakspeares, nor can I see it in the ditch near Harrow Station.

Galeopsis Ladanum. Near Chase Bridge, and abundantly in a field near Stonebridge; in both cases evidently introduced. I have searched Mr. Newbould's station, "above the chalk-pits, Harefield" and the fields adjoining for several years past, without securing a single specimen of this plant. The only station known to me, where it is undoubtedly native and of the true typical form, is the chalk-pit at Warren Gate, just outside our boundary.

Utricularia neglecta (Mr. Nicholson's late addition to the Middlesex Flora) was blossoming in great profusion this autumn in the pool near Youveney.

Chenopodium Vulvaria. Under the wall of Hampton Court (river side).

Rumex palustris. Plentiful about Youveney.—*R. pulcher* is everywhere common in districts 2 and 3.

Polygonum minus, though not now in "the S.E. corner of the first pond in Bushy Park," is plentiful along the north bank of the second pond from Hampton Wick Gate, and also along the bank of the feeder leading into it.—*P. mite* is also plentiful in the same feeder.

Salix aurita is abundant about heaths and woods between Ruislip Reservoir and Northwood. North of Harefield, near Newlands Wood, &c. I also gathered it on Hampstead Heath.

Epipactis media was very abundant this year in a copse near Uxbridge Common. This is doubtless Lightfoot's "*E. latifolia*, neighbourhood of Uxbridge," recorded by him some time before 1780.

Cephalanthera grandiflora grows in Garret Wood, a few yards beyond our boundary.

Ornithogalum umbellatum seems established in the moor-meadows above Uxbridge.

Juncus diffusus. Finchley Common. Harefield Road, beyond Uxbridge Common.—*J. compressus* has a wider range than supposed. It is abundant by the Thames from Staines Bridge to Fenton Hook Lock. About Laleham. In many places between Laleham and Shepperton. Above Kingston Bridge, and in meadows near Staines. (I cannot see it on Goulder's Green).

Alisma ranunculoides. Excluded as extinct from Finchley Common; is still plentiful there in swampy hollows towards the north-east angle. I can find it in none of the other stations, however.

Actinocarpus Damasonium. A single plant on Hadley Green, in the first pond to the left of the road after leaving Barnet, towards Potter's Bar. This, too, I can find in none of the places indicated, so that it seems to be almost extinct.

Triglochin palustre. Cowley. Uxbridge Moor. Near Ruislip. About Harefield and Springwell. Finchley Common.

Wolffia arrhiza, which for years has covered the pond on Knowle Green, Staines, in great profusion, I failed to detect both

this year and last. Of course it still exists, but *Lemna minor* had on each occasion, at the time of my visit, either hidden or supplanted it.

Eleocharis acicularis is abundant on the margin of the Queen's River in Bushy Park (in the broad part just before it passes underground), and on the north bank of the feeder, between the two ponds beyond. The record from "Elstree Reservoir" for this and so many other species is very misleading; there is no such station for any Middlesex plants. The road intersecting the reservoir at its lower extremity is in Herts, leaving a mere pond on the south or Middlesex side; a portion of this is also in Herts, and indeed in seasons of drought it is nearly dry. No plants worthy of notice are to be found in any part of it, and all the numerous species recorded thence will have to be, I fear, excluded.

Eriophorum polystachion. Boggy meadows near Uxbridge.

Carex pseudo-Cyperus. Colnbrook. Stanwell. Stanwell Moor, and pond by Woodfield House,, near Kingsbury Reservoir.

Alopecurus fulvus. Frequent in District 1. Extremely abundant on margin of ponds at Cranford.

Aira flexuosa. In barren meadows between Staines, Ashford and Charlton.

Avena pubescens is still more widely distributed than I thought. It follows the Colne river from the north-west boundary at Drayton Ford to Staines, being abundant on both sides of the river the whole length of the valley, and on the higher ground it extends from Springwell to Harefield, Ruislip and Ickenham (supplemented, however, on the downs about Harefield Park and Jack's Lock by *Bromus erectus*, there the one dominant plant). It grows on the railway banks between Uxbridge and West Drayton, and apparently dies out on the hills about Hillingdon. It was too late in the season to look for it in the Harrow and other districts; but having already traced it over many square miles of the county, I am more than ever surprised at its exclusion from the Middlesex Flora.

Bromus secalinus var. *velutinus.* Field near Ashford Ford.

Hordeum sylvaticum. Garret Wood (the only new record the excursion produced.)

Equisetum maximum. In no place did I find this so abundant and luxuriant as just outside the north-east corner of Finchley Common, near the brickfield; but the deep hollows in which it grows were unfortunately being filled up. Several other species called "rare" were found to be more or less frequent, and call for no special notice, as, for example, *Sparganium simplex*, quite common from South Mims and Potter's Bar to the extreme south of the county.

Many casuals and species evidently introduced with foreign seed were also frequently met with. Amongst those admitted into the British Flora and figured in Eng. Bot. were the following:—

Camelina sativa. Uxbridge. West Drayton. Ashford Common.

Lepidium Draba. Acton. Between Hampton Court and Kingston Bridge.

Reseda lutea. Twickenham. Field near Ealing. Bank of the bridge leading on to Staines Moor at Youveney; a curious distribution for this chalk plant!

Malva borealis. Abundant and quite established on the slope of a meadow near Stonebridge.

Melilotus arvensis. Twickenham.—*M. parviflora*. Near Uxbridge.

Trifolium resupinatum. Uxbridge. West Drayton. Twickenham.

Anthemis tinctoria. Field near Stonebridge. Several plants.

Stachys annua. Abundant in the same field; and a single plant between Worton and Chase Bridge.

The record of *Polygonum minus*, Harefield Moor (Journ. Bot. 1885, p. 340) was an error; and *Trifolium scabrum* (1884, p. 56), and *Carduus tenuiflorus* (1885, p. 39) should have been recorded as "casuals."

SUPPLEMENT TO NOTES ON RUBI.—No. 1.

By Charles C. Babington, M.A., F.R.S.

As the publication of my paper, 'Notes on British *Rubi*' (Journ. Bot. xxiv. pp. 216 and 225), has brought under my notice several new forms which require attention, I think it well to publish them at once. Of course the question is open to consideration which, and how many, of our distinguished forms are segregate species; and how the aggregate species are to be formed by their combination. There is much difference of opinion on this subject, and probably we had better wait until more of our plants have been identified with those of the Continent before we discuss it. It seems to me to be our duty now to identify and define our plants, as the great continental botanists have done. Genevier published no attempt to define aggregate species, neither did P. J. Müller; and Focke has only partially done so. Even our groups must be considered as artificial. In Nature the affinities are of course not arranged in a linear manner, but spread in a circular, if not spherical, mode around certain centres. This renders it most difficult to arrange the plants, as we have necessarily to place them in a linear series, and therefore sometimes to separate plants far from some of their apparent allies. I need not take up space by further notice of this difficult subject here, but will proceed to the description of the recently observed forms, three of which can be identified with much certainty with plants described by Genevier; and the other has been long known to me, but has now first a separate specific name given to it. I describe it as follows:—

1. R. Newbouldii Bab.—Stem slightly arching, angular upwards, subglabrous; prickles unequal, large, conical, patent from a large compressed base, much exceeding the many short aciculi and setæ; leaves 5-nate or 3-nate; *leaflets very finely but doubly dentate, green, and not felted beneath;* terminal leaflet broadly quadrangular-obovate, cuspidate, subcordate below; panicle long, its ultra-axillary

branches many corymbose patent, its lower branches racemose, falling short of the leaves, its prickles long, slender, declining; *sepals ovate-attenuate*, aciculate, setose, loosely reflexed; petals pale pink; stamens greenish white, exceeding the (pink?) styles.

R. Newbouldii Bab. Journ. Bot. 1886, 230.

R. Radula γ. *denticulatus* Bab. Man. ed. 5, 105; Brit. Rubi, 195. Stem arcuate-prostrate, angular. Prickles unequal, long, slender, conical, patent, from a long compressed base. Hairs few or none. Many setæ and strong aciculi, much shorter than the prickles, and unequal. Leaves 5-nate or 3-nate. Petioles slightly channelled, with many slender slightly declining prickles, many hairs, and few setæ. Leaflets very finely but doubly dentate, green and not felted, but with hairs on the veins beneath; terminal leaflet roundly and broadly quadrangular-obovate, cuspidate, 2 or 3 times as long as its petiole, subcordate below; basal leaflets obovate, cuspidate, stalked. Stipules linear-lanceolate.

Panicle open, with few axillary erect-patent racemose-corymbose branches falling short of the leaves, the ultra-axillary branches subcorymbose and patent; rachis and peduncles with many long slender declining prickles, hairy, setose, subtomentose. Leaves 3-nate; terminal leaflet obovate-cuspidate, 3-4 times as long as its petiole. Sepals ovate-attenuate, aciculate, setose, hairy, tomentose, green, with a slender point, reflexed. Petals oblong, pale pink. Stamens exceeding the (pink?) styles, greenish white. Young carpels bearing very short hairs or rather minute protuberances.

I have seen nothing resembling the plant found by Mr. Newbould at Loxley, near Sheffield, until the Rev. Dr. Hind (who is occupied with the Flora of Suffolk) allowed me to see a specimen gathered by him at Mellis, in Suffolk, on Aug. 18th, 1880, where it is abundant. Dr. Hind's plant is much finer than that from Loxley, but seems clearly to be the same growing in a more favourable situation. I think that they differ sufficiently from *R. Radula* to claim a distinct name. The very finely denticulate and nearly naked leaves, and the ovate-attenuate sepals will distinguish *R. Newbouldii* from its allies. It seems to show a strong tendency towards the *Kœhleriani* by the armature of its stem. It gives me much pleasure to name it in commemoration of my lamented friend, its original discoverer in 1846.

2. R. MELANOXYLON Müll. & Wirtg. — Stem angular, often subglabrous; prickles unequal, declining or subfalcate; aciculi and setæ variable; leaves quinate or ternate; *leaflets* coarsely and doubly *serrate*, even above, pale green, hairy on the veins beneath; terminal leaflet broadly obovate, slightly cordate below, ("acuminate") cuspidate; *basal leaflets not imbricate*, stalked; panicle short, rounded at the end, hairy, with few or no rather distant axillary racemose branches, its terminal peduncle shortest, its prickles many, long, slender, declining, its aciculi and setæ few; sepals ovate-attenuate, slightly aciculate and setose; petals pinkish; stamens exceeding the styles.

R. melanoxylon P. J. Müller & Wirtgen in Herb. Rub. rhen. ed. 1, No, 181 (1861); Genev. Monog. ed. 1, 133; ed. 2, 147;

Focke! Synop. 257. — Stem (its direction is unknown to me) angular, with scattered hairs or subglabrous. Prickles rather unequal, declining or subfalcate. Aciculi and setæ unequal, more or less abundant. Leaves 5–3-nate, coarsely and doubly serrate, even above, pale green, with shining hairs on the veins beneath; petiole not channelled and, as well as the midrib, beneath with many hooked prickles, aciculate, setose; terminal leaflet broadly obovate, slightly cordate below, cuspidate ("acuminate"), 2–3 times the length of its pedicel; basal leaflets shortly stalked, not imbricate. Panicle short, rounded at the end, its prickles many long slender unequal, declining, its aciculi and setæ few. Leaves often ternate, with the lateral leaflets deeply lobed externally. Sepals ovate-attenuate, slightly aciculate and setose. Petals pinkish or white, oval, distant. Stamens red-based, exceeding the pinkish ("verdâtres," *Gen.*) styles. Young carpels pilose.—"There is a broad flat space between the stamens and styles." *Rogers.*

Abundant on Puddleston Heath, and between Hampisham and Evershot, Dorset, July, *Rev. W. Moyle Rogers*. These places are many miles apart.

This plant will be seen to be closely allied to *R. Kœhleri*, although much less prickly.

3. R. PLINTHOSTYLUS Genev. — Stem prostrate, angular, with many very unequal slightly declining prickles; aciculi and setæ mostly short, and, as well as the prickles, enlarged and compressed at their base; leaflets unequally and rather doubly serrate, green, and hairy only on the veins beneath; *terminal leaflet obovate acuminate, narrowed below*; basal leaflets lanceolate, not imbricate, shortly stalked; panicle short, few-flowered, with a short terminal peduncle, its *prickles* many, *slender*, *straight*, *horizontal*, its aciculi, setæ, and hairs many; sepals ovate-lanceolate, leaf-pointed, aciculate and setose, spreading; petals pinkish white, oblong-obovate, clawed; stamens white, exceeding the pinkish styles; young carpels pilose.

R. plinthostylus Genev. Monog. ed. 1, 108 (1869); ed. 2, 99.—Stem "prostrate," not furrowed. Prickles many, very unequal, slightly declining, very much enlarged at their base, becoming gradually smaller so as to be at last indistinguishable from the setæ. Hairs few. Leaves 3–5-nate, unequally and rather doubly serrate, green, and hairy only on the veins beneath. Petiole not channelled, with strong hooked prickles. Stipules filiform. Terminal leaflet three times as long as its stalk, obovate, acuminate, slightly narrowed below; basal leaflets lanceolate, narrowed at both ends, shortly stalked, not imbricate. Panicle short, few-flowered, with a short terminal peduncle; prickles long, straight, slender, patent or declining, hairy and setose; ultra-axillary branches often 1-flowered. Leaves 3-nate; terminal leaflet lanceolate, gradually narrowed below. Sepals ovate-attenuate, green, with few aciculi and setæ, patent. Petals oblong, clawed, pinkish or nearly white, distinct. Stamens white, exceeding the pinkish styles. Young carpels pilose.

Minster Valley, E. Cornwall, June, *Rev. W. Moyle Rogers*.

I think that this plant belongs to the *Kœhleriani* group. On the true panicle I find all the prickles long, slender, and usually patent; but below it there are many that are deflexed. Such is also the case on Genevier's specimens, although he laid much stress upon their being horizontal, that is, patent, to distinguish the species.

4. R. PODOPHYLLUS Müll. — *Stem prostrate*, angular, with few clustered hairs and few setæ; prickles slender, rather unequal, declining from an oblong compressed base; leaves 5–3-nate, rather irregularly but finely serrate, with a *few larger patent teeth*, subpilose above, rather paler and hairy beneath; terminal leaflet oval-oblong, acuminate; panicle narrow, simple or subracemose, with short hairs and setæ, its lower branches racemose-corymbose, axillary few-flowered, its prickles slender, declining; sepals hairy, felted, setose, aciculate, reflexed; petals white, much narrowed below; stamens white, exceeding the greenish styles; carpels glabrous.

R. podophyllus P. J. Müll. in Boulay Ronces Vosg. Not. p. 61, spec. 44 (1867); Genev.! Monog, 129. — Stem prostrate, angular, striate, a few very short setæ. Prickles rather unequal, declining (or deflexed). Leaves 5–3-nate, pale green and not felted beneath, finely but irregularly serrate, a few of the larger teeth patent. Petioles not channelled, and, as well as the midribs, beneath with hooked prickles. Terminal leaflet nearly three times as long as its petiole, oval-oblong, acuminate. Basal leaflets shortly stalked, oval. The intermediate of 5-nate, and lateral of 3-nate, leaves with short but conspicuous stalks. Stipules linear-lanceolate. Panicle narrow, simple or subracemose, with few short hairs and setæ, slightly aciculate, with slender declining prickles which are deflexed on its lower part: its lower axillary branches few-flowered, the upper simple, all more or less ascending. Sepals hairy and felted, with few setæ and aciculi, ovate-attenuate. Petals white, much narrowed below. Stamens exceeding the greenish styles. The young carpels appear to be quite glabrous.

"On rocky slaty places abundantly at Blaenau, Festiniog, N. Wales, Aug.," *Rev. W. Moyle Rogers*.

There seems no reasonable doubt of the identity of this plant with that of Müller. Although one of my rather numerous specimens from Boulay has very strong aciculi on the faces of its stem, his other specimens want them. This closely resembles some forms of *R. carpinifolius*, but that is erect-arcuate (not prostrate, as this seems to be), has no setæ except one occasionally, equal not unequal prickles, leaves nearly if not always quinate and much more hairy beneath, and wanting the few rather larger patent teeth; its panicle also is much more racemose, and its sepals are apparently not setose nor aciculate; petals not so much narrowed below; and the young carpels are downy.

MR. J. J. COOPER'S COSTA RICA FERNS.

By J. G. Baker, F.R.S., F.L.S.

The ferns which form this collection were gathered recently in the forests of Costa Rica by Mr. John J. Cooper, who resides at Cartago, and is specially engaged in collecting birds and orchids. They were sent by him to the United States National Museum at Washington, and were entrusted to me for determination by the authorities of that institution. The collection contains 112 species, of which the material is complete enough for their determination. The only previous set of ferns from Costa Rica that has been worked out is one gathered by Mr. P. G. Harrison, on which I reported in the 'Journal of Botany' for 1884, p. 362. Mr. Harrison gathered 49 species, twenty of which are not contained in Mr. Cooper's set, so that the total number of ferns now known in the country is 132. There can be no doubt that by further exploration this number will be greatly increased.

Gleichenia pubescens H. B. K. Three varieties, the type, a large glabrous form, and a third with densely paleaceous rachises.—*G. pectinata* Presl.—*G. dichotoma* Hook.

17*. **Gleichenia intermedia,** n. sp. — Stipe naked, brown, terete. Lamina glabrous, firm in texture; pinnæ trijugate, erecto-patent, forked an inch from the base, the entire portion leafy all the way down, with crowded dilated lower segments; forks lanceolate, 4–6 in. long, ¾–1¼ in. broad at the middle; final segments linear, crowded, broadly adnate at the base, the central ones longest, 8–9 lines long, 1-12th in. broad, rather glaucous beneath. Veins 12–15-jugate, forked, erecto-patent. Sori medial on all the veins, consisting at most of four sporangia. Recedes from *G. pubescens* in the direction of *G. dichotoma* by its crowded leafy lower segments. Besides the type there are two well-marked varieties,—*dissitifolia*, with fewer final segments, spaced out upon the rachis; and *flexuosa*, with a very zigzag rachis to the final forks, and spaced-out deflexed linear final segments, reaching 18–21 lines in length.

Cyathea arborea Sm. var. *nigrescens*.—*C. divergens* Kunze.

Hemitelia horrida R. Br. A form with the veins entirely free.

Alsophila pruinata Kaulf.

The collection contains five other tree-ferns, without sori, or otherwise too incomplete for determination.

Hymenophyllum ciliatum Sw. — *H. polyanthos* Sw. — *H. myriocarpum* Hook.

Trichomanes crispum Sw.—*T. radicans* Sw.—*T. rigidum* Sw.

Dicksonia cicutaria Sw., type and var. *D. incisa* Fée. — *D. rubiginosa* Kaulf.

Davallia inæqualis Kunze.—*D. Imrayana* Hook.—*D. Schlechtendahlii* Presl.

Lindsaya trapeziformis Dry.—*L. guianensis* Dry.

Adiantum concinnum H. B. K. — *A. tenerum* Sw. — *A. macrophyllum* Sw.—*A. patens* Willd.

48*. **Adiantum Cooperi**, n. sp. — Stipe and rachises quite naked, slender, glossy, castaneous. Lamina deltoid, 3–4-pinnate, firm in texture, glabrous, green, not at all glaucescent beneath, 9–12 in. long. Pinnæ cut away on the lower side at the base, erecto-patent, the lowest pair much the largest. Final segments shortly petioled, rhomboid, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, deltoid and entire in the lower half, lobed and crenate round the remainder, minutely denticulate when sterile. Sori oblong-reniform, with a deep central sinus, 1-12th in. diam., usually 4–5 to a segment. Indusium firm, persistent, glabrous. Allied to *A. glaucophyllum* Hook., from which it differs by its much larger, fewer, less crowded segments, not at all glaucescent beneath.

Lonchitis pubescens Willd.

Hypolepis repens Presl.

Cheilanthes lendigera Sw.

Pellæa intramarginalis J. Sm.—*P. angustifolia* Baker.

Pteris aquilina L. vars. *lanuginosa* and *caudata*.—*P. quadriaurita* Retz.—*P. palmata* Willd.—*P. aculeata* Sw.—*P. incisa* Thunb.

Lomaria attenuata Willd.—*L. procera* Spreng.

Blechnum occidentale L., type and a small variety with a very scaly rachis. — *B. longifolium* H. B. K., type and var. *B. fraxineum* Willd.—*B. volubile* Kaulf.

Asplenium serratum L.—*A. monanthemum* L.—*A. pumilum* Sw.—*A. lunulatum*, type and var. *A. erectum* Bory. — *A. anisophyllum* Kunze. — *A. Serra* L. & F. — *A. rhizophorum* L. — *A. abscissum* Willd., type and form connecting it with *A. cultrifolium* L.—*A. auriculatum* Sw. — *A. bissectum* Sw. — *A. furcatum* Thunb. — *A. auritum* Sw. — *A. cicutarium* Sw. — *A. bulbiferum* Forst. — *A. Shepherdi* Kunze, var. *costaricense*, n. var. Pinnæ distinctly petioled, conspicuously truncate at the base on the lower side, with a large separated auricle at the base on the upper side, and a blade much narrower than in the type ($\frac{1}{3}$ in. broad at the base) and very acuminate.—*A. sylvaticum* Presl.—*A. radicans* Schk.—*A. Lindbergii* Mett.—*A. neglectum* Karst.

Didymochlæna lunulata Desv.

Aspidium juglandifolium var. *macrosorum*, n. var. Veins all free, conspicuously raised. Sori much longer than in the type. — *A. trifoliatum* Sw.

Nephrodium Filix-mas var. *paleaceum*.—*N. patens* Desv.—*N. conterminum* Desv., at least four varieties.—*N. patulum* Baker.—*N. villosum* Presl.

Nephrolepis cordifolia Presl.

Oleandra neriiformis Car.—*O. nodosa* Presl.

Polypodium trichomanoides Sw. — *P. elasticum* Rich.—*P. pectinatum* L. var. *Wagneri* Mett., and *acuminatum*, n. var.; texture firmer than in the type; pinnæ narrow and very acuminate. — *P. plebeium* Schlecht., type and var. *P. cheilosticton* Fée, and var. *Cooperi*, n. var.; frond much larger than in the type; pinnæ spaced out, linear, crenulate, very acuminate, with a row of white dots near the edge on the upper surface. —*P. Friedrichsthalianum* Kunze.—*P. incanum* Sw.—*P. thyssanolepis*

A. Br.—*P. squamatum* L. — *P. piloselloides* L.—*P. glaucophyllum* Kunze.—*P. loriceum* L., four varieties, one just like the Brazilian *P. Catherinæ* L. & F.—*P. chnoodes* Spreng.—*P. neriifolium* Schk.—*P. angustifolium* Sw. — *P. repens* L. — *P. aureum* L., two varieties, both with uniseriate sori, one green with sori laxly disposed, the other glaucous with close sori. — *P. lanceolatum* L. — *P. percussum* Cav.—*P. crassifolium* Sw.

118*. **Polypodium percrassum,** n. sp.—Stipes densely tufted, very slender, 1–2 in. long, clothed with fine spreading brown hairs. Lamina ligulate, obtuse, deeply repand, 3–5 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, narrowed to the base, very thick, moderately firm in texture, green on both surfaces, inconspicuously pilose. Veins quite immersed and hidden, only the midrib visible. Sori round or oblong, quite immersed in deep pits in the substance of the frond, placed in a single row, a little space within the margin. A very distinct and interesting novelty, nearest *P. trifurcatum* L.

218*. **Polypodium aspidiolepis,** n. sp. — Rhizome stout, short-creeping; paleæ dense, lanceolate, spreading, membranous, pale brown. Stipes 2–3 in. long, stiffly erect, densely scaly; paleæ mostly peltate, with a brown centre and pale scariose edge, a few spreading. Lamina thick, rigid, ovate-lanceolate, bipinnatifid or bipinnate, 3–4 in. long, green and naked above, densely clothed with similar peltate paleæ on the lower surface and main rachis. Upper pinnæ lanceolate, many deeply pinnatifid, with lanceolate lobes, the lowest pinnæ the largest. Veins quite hidden. Sori large, brown, globose, mainly in single rows on each side of the midrib of the pinnæ. Allfed to *P. murorum* Hook.

Gymnogramme ferruginea Kunze. — *G. trifoliata* Desv. — *G. tartarea* Desv.—*G. calomelanos* Kaulf., type and var. *chrysophylla.*

Vittaria lineata Sw.

Antrophyum ensiforme Hook.

Acrostichum flaccidum Fée, type and var. *stipitatum*, n. var., with sterile fronds furnished with a distinct stipe. — *A. Lingua* Raddi. — *A. hybridum* Bory. — *A. spathulatum* Bory. — *A. viscosum* Sw.—*A. Bellermannianum* Klotzsch.

Anemia Phyllitidis Sw.—*A. hirsuta* Sw.

Marattia laxa, Kunze.

Danæa Moritziana Presl., var. or perhaps a distinct species, with a compressed rachis, winged between the pinnæ down to the base of the frond, as in the West Indian *D. alata.*

NOTES ON NOMENCLATURE.

By Dr. J. B. De Toni and Dr. P. Voglino.

The increase in the number of homonymous genera causes great confusion in scientific studies, and we think it useful, following Harkness' example, to note some generic names which are doubly employed in botanical taxonomy. Names common both to genera of plants and animals are even more copious, but it is impossible to

find a remedy. Thus we find *Appendicularia* Chamisso (Tunicata) and *Appendicularia* DeCand. (Melastomaceæ); *Asterina* Nardo (Echinodermata) and *Asterina* Léveillé (Pyrenomyceteæ); *Bursaria* Mueller (Infusoria) and *Bursaria* Cav. (Pittosporeæ); *Ceratium* Schrank (Flagellata) and *Ceratium* Alb. & Schw. (Hyphomyceteæ); *Coryne* Gærtn. (Hydroidea) and *Coryne* Nees (Discomyceteæ); *Euphrosyne* Savigny (Annelides) and *Euphrosyne* DeCand. (Compositæ); *Euryale* Lamarck (Echinodermata) and *Euryale* Salisb. (Nymphæaceæ); *Gracilaria* Haworth (Lepidoptera) and *Gracilaria* Grev. (Rhodophyceæ); *Hermannia* Nicol. (Acari) and *Hermannia* Linn. (Sterculiaceæ).

Among homonymous genera in the Vegetable Kingdom we note now the following, intending later on to point out others. It would be preferable, instead of changing the newer names (not to increase the too numerous synonyms), to join to them the prefix *neo*, or to give them a diminutive termination:—

Antennaria Gærtn. (1791) Fruct. ii. p. 410, t. 167 (Compositæ).
,, Link (1809) in Schrad. u. Journ. iii. i. p. 16 (Hypho-myceteæ).
Chauvinia Bory (1828) in Duperr. Voy. Crypt. p. 204, t. 23 (Chlo-rophyceæ).
,, Steud. (1854) Syn. Pl. Glum. i. p. 362 (Graminaceæ).
Cryptodiscus Corda (1838) Ic. Fung. ii. p. 37, t. xv. 129 (Disco-myceteæ).
,, Schren. (1841) Enum. Plant. nov. p. 64 (Umbelliferæ).
Cystophora J. Ag. (1841) Symb. i. p. 3 (Melanophyceæ).
,, Rabenh. (1844) Deutsch. Krypt. Fl. p. 75 (Hypho-myceteæ).
Dictyopteris Lamour. (1809) in Desv. Journ. Bot. ii. p. 129 (Dic-tyotaceæ).
,, Presl. (1836) Pterid. p. 194 (Filices).
Helicophyllum Brid. (1827) Bryol. ii. p. 771 (Hepaticæ).
,, Schott. (1856) Syn. Aroid. i. p. 22 (Aroideæ).
Leptotrichum Corda (1842), Ic. Fung. v. p. 10, 51, t. ii. 16; Sacc. Syll. iv. p. 690 (Hyphomyceteæ).
,, Hampe (1847), Linnæa, xx. p. 74 (Musci).

SHORT NOTES.

Carex atrata Linn. in Easterness.—In August last we noticed a tuft of *C. atrata* in the Larig Pass, within the Spey drainage, but, as it was getting late in the evening, we could not wait to look for more of it. It does not appear to have been previously recorded for Vice-county 96.—H. & J. Groves.

Epilobium lanceolatum S. et M. in Kent.—In September, 1886, when walking from Chislehurst to Bickley, I noticed by the road-side, about a mile from the latter place, an *Epilobium*. Being in a hurry to catch a train I merely broke off a piece, but found when I

got home it was *E. lanceolatum*. The next week I traced it here and there on a hedgebank for about half a mile, and have no doubt it extends farther; but my time was limited. It is a new record for V. C. 16. West Kent.—Arthur Bennett.

Carum Carui L. as a native in Britain.—The notice of this plant as a probable native in Beds., by Mr. Saunders, in last month's Journal, makes me wish to say that it occurs in Herefordshire, in what I cannot doubt to be a truly native state. It occupies old unbroken meadow and pasture land, on stiff cold clay, at intervals in many stations and in large quantity, for a space of three or four miles, in the Woolhope district of this county. It was discovered in this district by Mr. A. T. Wilmott, not later than the year 1850. More recent investigations and inquiries in the district have convinced me that the *Carum* is very unlikely to be an introduced plant there, and I have no doubt that it is a native.—Augustin Ley.

Potentilla rupestris L. in Radnorshire.—I found this rare plant in Radnorshire during a botanical walk there this summer. It occupies the sides and summit of a range of rocks of the Llandeilo series, in the south-west of the county. I must have counted in this station some fifty specimens of the plant. All were past flowering at the time of my visit in July, but there could be no doubt either of its identity or that it was a native plant. The station being one easily accessible, and in which the plant could readily be eradicated, it will be well not to publish any more precise description of its locality.—Augustin Ley.

NOTICES OF BOOKS.

Two parts of the 'Icones Plantarum' were issued in November last: one, by Mr. Baker, devoted entirely to Ferns, the other containing the following new genera of Phanerogams:—*Plagiospermum* Oliv. (Celastraceæ); *Somalia* Oliv. (Acanthaceæ); *Oligobotrya* Baker (Liliaceæ); *Micropora* Hook. fil. (Laurineæ).

New Books. — A. Lübbert, 'Der Staphylococcus pyogenes aureus und der Osteomyclitiscoccus' (Würzburg: 8vo, pp. vi. 103, tt. ii.). — E, Warming, 'Den almindelige Botanik' (Philipsen, Copenhagen: 8vo, pp. 366: 268 cuts).—P. Girod, 'Manipulations de Botanique' (Paris, Baillière, "1887": 8vo, pp. 72, tt. xx.).—C. Flügge, 'Die Mikroorganismen' (Leipzig, Vogel: 8vo, pp. xviii. 692: 144 cuts). — M. T. Masters & U. Dammer, 'Pflanzen-Teratologie' (Leipzig: 8vo, pp. xvi. 610: 243 cuts, 1 plate). — W. D. Hay, 'Elementary Text-book of British Fungi' (London, Sonnenschein: 8vo, pp. 238: 2*s.* 6*d.*).—E. Strasburger & W. Hillhouse, 'Handbook of Practical Botany' (London, Sonnenschein: 8vo, pp. 425, 116 cuts: 7*s.* 6*d.*). — R. C. Haldane, 'Subtropical Cultivations and Climates' (London, Blackwood: 8vo, pp. xii. 308; 8*s.* 6*d.*).

Articles in Journals.

Bot. Centralblatt. (Nos. 50–52).—H. Steininger, 'Beschreibung der europäischen Arten des genus *Pedicularis*.' — C. Hassack, 'Untersuchungen über den anatomischen Bau bunter Laubblätter, nebst einige Bemerkungen, betreffend die physiologische Bedeutung der Buntfärbung derselben.' — (No. 50). H. G. Reichenbach, 'Ill. Odoardi Beccari novitiæ Orchidaceæ Papuanæ' (10 new species).

Bot. Notiser (häft. v.).—H. Tedin, 'On der primära barken hos våra löftråd såsom skyddande väfrad.' — N. Bryhn, '*Catharinea anomala*, n. sp.'—(häft. vi.). S. Murbeck, 'Vaxtgeografiskt bidrag till Skandinaviens flora.'

Bot. Zeitung (Nov. 26; Dec. 3, 10).—G. Warburg, 'Die offentlichen Gärten (speciell die botanischen) in Britisch-Indien.'—(Dec. 10, 17). F. v. Tavel, 'Beiträge zur Entwickelungsgeschichte der Pyrenomyceten.' — (Dec. 17). M. Kronfeld, 'Ueber die Correlation des Wachsthums.'

Bull. Torrey Bot. Club (Dec.). — G. Vasey, 'New Mexican Grasses' (*Eriochloa aristata*, *Setaria latiglumis*, *S. pauciseta*, *Ægopogon gracilis*, *Muhlenbergia ramosissima*, *M. speciosa*, *M. Palmeri*, *M. argentea*, spp. nn.). — E. L. Gregory, 'Pores of the Libriform Tissue.'

Flora.—E. Dennert, Memoir of Julius Wilhelm Albert Wigand (Ap. 21, 1821—Oct. 22, 1886). — K. Müller, *Orthotrichum Pringlei* Müll., *Barbula Henrici* Rau., spp. nn.—(Dec. 11). H. G. Reichenbach, '*Orchideæ*' (48 new species). — (Dec. 21). P. G. Strobl, 'Flora der Nebroden' (contd.).

Gardeners' Chronicle (Dec. 4). — *Crassula rhomboidea* N. E. Br., sp. n. — U. Dammer, 'Fasciated root of *Pothos*' (fig. 140).—(Dec. 11). J. G. Baker, 'Wild forms of tuberous *Solanum*.'—*Abies Lowiana* (figs. 146–148). — W. G. Smith, 'Celery Fungus (*Puccinia bullata*)' (fig. 149). — (Dec. 18). *Cypripedium præstans* Rchb. f., sp. n. — C. S. Sargent, '*Tsuga Caroliniana*' (fig. 153).—(Dec. 25). W. G. Smith, 'Wheat in prehistoric times' (fig. 156). —*Anthurium punctatum* N. E. Br., *Dendrobium bracteosum* Rchb. f., spp. nn.

Journ. Linn. Soc. (Botany, xxii. No. 146: Oct. 15).—W. Mitten, 'Mosses and Hepaticæ collected in Central Africa' (5 plates: many new species). — H. Trimen, 'On *Balanophora Thwaitesii*.' — W. B. Hemsley, 'Vegetation of Diego Garcia' (*Calympores Garciæ* Mitt., sp. n.).

Oesterr. Bot. Zeitschrift (Dec.). — L. Sinonkai, '*Tilia Braunii*, n. sp.' — J. Ullepitsch, *Gagea Szepusiana*, n. sp. — V. Borbás, '*Euphorbia angustifrons*.' — K. Schilberszky, 'Unregelmässige Blüthezeiten.'—E. Formánek, 'Flora der Karpathen' (contd.).

Pharmaceutical Journal (Dec. 11).—J. E. T. Aitchison, 'Plants of Afghanistan and their medicinal products' (*Ferula suaveolens* Aitch. & Hemsl., *Delphinium Zalil* Aitch. & Hemsl., spp. nn.: names only).

LINNEAN SOCIETY OF LONDON.

Nov. 18*th*.—William Carruthers, F.R.S., President, in the chair. Mr. Henry Bury was elected a Fellow of the Society.—Mr. W. H. Beeby showed specimens of *Callitriche truncata* Gussone, from near Westerham, Kent (see Journ. Bot. 1886, p. 346).—Mr. D. Morris exhibited two enlarged photographs of the *Castilloa* rubber tree of Central America (see Trans. Linn. Soc. Bot. 2nd ser. vol. ii. pt. 9). The larger photographs illustrated the manner in which trees were treated to extract rubber, by a special cut from above, downwards. Trees of ten years old and upward are said to yield about eight gallons of milk at the first bleeding. This milk is coagulated by the use of the juice of *Calonyction speciosum*, and the rubber prepared by washing and pressing. Mr. Morris described the habit and growth of the trees in their native forests, and expressed the opinion that for cultural purposes this rubber tree may be better suited to the circumstances of planters than any other. It could be utilized as a shade-tree in cacao and coffee plantations, and yield at the end of ten years at the rate of twenty shillings per tree in marketable rubber. In British Honduras trees are tapped for rubber every three or four years.—Mr. H. N. Ridley exhibited and made remarks upon specimens and drawings of the species of *Coryanthes*, viz., *C. macrantha* Hook, and *C. maculata punctata*. He mentioned that Mr. Rodway, of Demarara, had lately published some observations, showing that the statement hitherto prevalent as to the fertilization of certain species of the genus by bees, as averred by Crüger, did not obtain in all, inasmuch as in *C. speciosa* he had noticed that a kind of green fly was the fertilizer.—Mr. Geo. Murray exhibited specimens of *Rhipilia*, in spirit, from Grenada, West Indies; these were obtained by diving, from a depth of five fathoms.—Mr. W. Fawcett exhibited coloured drawings of *Hydnora abyssinica* and *H. Bogosensis*, sent by Signor Beccari, from Florence. They clearly showed the difference between the two species, for, besides differing in colour, *H. abyssinica* has a hook-like process below the apex, and its ramentiferous surfaces have long ramenta at their margins, whereas there is no hook-like process in *H. Bogosensis*, and the margins are naked. Both species differ from the common *H. africana* in the ramentiferous surfaces not extending to the apex.—Dr. Maxwell Masters read a paper "On the Floral Conformation of *Cypripedium*." In this contribution he stated that the explanation may be sought in the course of development, in the minute anatomy and arrangement of the fibro-vascular bundles, and in the examination of the comparative morphology of the flower. Organogeny affords in this case only doubtful testimony, as the flower is irregular from the first. The distribution of the primary fibro-vascular bundles, and of the offshoots from them, affords more conclusive evidence of the true construction of the flower, and, if studied in conjunction with the comparative morphology, leads to very satisfactory results. By these means it becomes easy to refer the flower to the ordinary type seen in a regular pentacyclic and trimerous monocotyledon, from which it is reasonable to infer it may have originated. The

deviations from the type have arisen from concrescence or inseparation of some part, inordinate development of others, and complete suppression of a third series. The author cited instances showing numerous intermediate gradations between the ordinary conformation of *Cypripedium* and that of the ideal type, thus proving that what was at first a matter of speculation and inference from imperfect evidence, was borne out by actual fact. The illustrations brought forward afforded examples of the reduction of parts and two increased number of parts, in connection with which the author alluded to the special tendency to develop the second or inner row of stamens, as happens in *Restiaceæ* and *Xyridaceæ*, while in *Iridaceæ* the opposite tendency is manifested. Another series of illustrations comprised cases of regular and irregular peloria, which were of special importance as affording evidence, on the one hand, of the probable past conformation of the flower, and, on the other, of the probable course of development in the future. —Mr. J. G. Baker read a paper entitled "Further Contributions to the Flora of Madagascar," in which upwards of 250 new plants, seven of which are new genera, gathered recently by the Rev. Richard Baron, F.L.S., are described. Of the new genera, one belongs to *Menispermaceæ*, one to *Geraniaceæ* near *Impatiens*, one to *Rubiaceæ*, and two each to *Melastomaceæ* and *Compositæ*. Of well-known Cape types *Pelargonium*, *Stæbe*, *Cineraria* and *Belmontia* are here for the first time added to the Madagascar Flora. The faint affinity of the flora of Madagascar to that of India and Malaya is strengthened by the discovery of the genus *Cyclea* and of new species of *Alyxia*, *Didymocarpus* and *Strobilanthes*. Of types of economic interest there are new species of *Dalbergia*, *Macaranga*, *Strychnos*, *Balsamodendron* and *Garcinia*. It seems that during the last ten years between 1100 and 1200 new plants from Madagascar (29 of which are new genera) have been described in this Journal and in the Journal of the Linnean Society, nearly all of them by our own countrymen.

December 3rd.—William Carruthers, F.R.S., President, in the chair. The following gentlemen were elected Fellows of the Society, *viz.*:—J. W. Willis Bund, Arthur Dendy, Anthony Gepp, To Kutaro Ito, F. Krause, F. M. Lascelles, Fred Sander, R. von Lendenfeld, John Samson, Henry O. Burton, A. W. Sutton, and Charles W. Wilson. George Sim was elected an Associate of the Society.—The President then read a letter from the Rev. Miles J. Berkeley, intimating the lamented death of his old co-worker on Fungi, Mr. Christopher E. Broome.—Mr. George Maw exhibited ten photographs of growing Narcissi, made in the Riviera in 1870. He afterwards gave a short account of the North African and South Spanish Narcissi observed by him on a recent visit thither. *Narcissus papyraceus* extends as far as Fez in Morocco, south of which *N. Broussoneti* takes its place, extending from Saffi to Mogador. Allusion was made to the smallest of the white forms of *N. Tazetta* in the Island of Teneriffe. Of the autumnal species reference was made to *N. nudiflorus*, which had been lost sight of for half a century, but which Mr. Maw had rediscovered in 1883 in

the neighbourhood of Gibraltar, and again lately near Tangier. A hybrid between *N. viridiflorus* and *N. serotinus* was found by him near Gibraltar, and a series of hybrids between *N. viridiflorus* and *N. elegans* were got in North Morocco. Mr. Maw observed that *N. serotinus* was limited to the South of Spain and *N. elegans* to the Morocco coast; the latter plant bearing true leaves. The *N. nudiflorus* and *N. serotinus* he asserted were leafless, the scape appearing without leaves, and what seemed leaf-organs he assumed were flowerless scapes. Mr. Maw also referred to the abundance of a small Amaryllid, *Tapeinanthus humilis* Herbert (= *Pancratium humile* Cav.), about eight miles south of Tangier, and which he collected both in fruit and flower. Of miscellaneous plants collected by him during the tour, *Pæonia coriacea*, *Lavandula undulata*, *Eryngium glaciale*, and *Asplenium Petrarchæ* were obtained on the Sierra Nevada, and *Saxifraga biternata* at El Forcal, near Antiquerra in the South of Spain. — Dr. Henry Trimen read a paper on Hermann's Ceylon Herbarium and Linnæus's 'Flora Zeylanica.' The collection of dried plants and the drawings of living ones made in Ceylon by Paul Hermann, in the later half of the 15th century, possess a special interest as being the first important instalment of material towards a knowledge of the botany of the East Indies: but Hermann himself, who died in 1695, published very little of this material. Some of his MSS. were subsequently printed by W. Sherard, including a catalogue of the herbarium as then existing, under the title of 'Museum Zeylanicum' (1717). This herbarium was lost sight of till 1744, when it was recognized by Linnæus in a collection sent to him from Copenhagen. After two years' work at it Linnæus produced, in 1747, his 'Flora Zeylanica,' in which all the plants that he could determine are arranged under his genera. At that date Linnæus had not initiated his binominal system of nomenclature, but in his subsequent systematic works he quoted the numbers of the 'Flora Zeylanica,' and thus Hermann's specimens became the types of a number of Linnæus's species, for the most part additional to those in his own herbarium in the possession of this Society. Hermann's herbarium is now in the Botanical Department of the British Museum, having been purchased by Sir Joseph Banks from Prof. Freschow, of Copenhagen; the specimens are in very fine preservation, but some were originally scanty or imperfect. The paper consists of the results of a critical examination of the whole of the collection, and a catalogue is given of all the 'Flora Zeylanica' species as named by Linnæus, along with the determinations of Hermann's species of each, as now identified. Not a few difficulties, ambiguities, and misapprehensions of Linnæus's species have been thus recovered and cleared up, and the most important of these are discussed in a series of short critical notes which form the conclusion of the paper.

Mr. William Fawcett, late of the Botanical Department, British Museum, has been appointed Director of the Botanical Gardens, Jamaica. Mr. Fawcett left England on Dec. 29th.

LEJEUNEA HOLTII, A NEW HEPATIC FROM KILLARNEY.

By Richard Spruce.

(Plate 272).

Lejeunea Holtii, n. sp.—Elatiuscula, fragilis, e flavido rufula. Caules 1–1½ pollices longi, prostrati, in muscis laxe reptantes, raro substratificati, pinnatim pauciramosi ramique persæpe ramulis florigeris, aliis ♂, aliis ♀, eleganter pinnulati. Folia late patentia, distiche explanata vel decurvo-convexula, dissita contiguave, rarius subimbricata, suboblique ovato-oblonga ovatave, obtusa, interdum subacuta, rarius rotundata, prope basin subsinuato-complicata; lobulus perparvus, folio plus 5-plo brevior, subovoideus, inflatus, apice vel in folium sensim abiens vel brevi-acutus et incurvus, in caulibus elongatis, efloriferis præcipue, haud raro obsoletus; cellulæ mediocres vel submajores, æquilatero-hexagonæ (præterquam mediæ inferiores paulo oblongatæ), subleptodermes, trigonis angularibus nullis, convexulæ (unde folia margine subcrenulata videntur). Foliola tenera, foliis subtriplo breviora, distantia, orbiculata, ad medium subobtuse bifida, segmentis acutis vel subobtusis. Flores monoici, utriusque sexus ramulo perbrevi constantes. Ramuli ♀ foliis unijugis parvis—rarissime paulo longiores et foliis ad 4-jugis—infra florem instructi, normaliter simplicissimi, innovatione nulla stipati, casu perraro innovationem minutam parvifoliam, interdum masculam proferentes. Bracteæ foliis subduplo breviores, recurvulo-patentes, ultra ½ bilobæ, lobis parum complicatis lanceolatis acutis obtusisve, postico paulo breviore duplo angustiore; bracteola postica lanceolata vix ad ⅓ usque auguste bifida, segmentis acutis, cum altera bractea altiuscule connata. Perianthia alte emersa, bracteas plus duplo superantia, obpyramidato-pyriformia, apice depresso rostello perbrevi tenui mucronulata, vix compressula, cellulis æquilatero-hexagonis pellucidis pulchre reticulata, 5-carinata, carinis præaltis, alas fingentibus, raro apicem versus limbo pertenui cellulis uniseriatis constante (ala vix dicenda) marginatis. Calyptra dimidio brevior, obovata, basi constricta quasi brevistipitata. Capsula globosa (exserta haud visa). Andrœcia sæpe crebra, amentulis sive ramulis folio collaterali subæquilongis constantia; bracteæ sub 3-jugæ, imbricatæ, turgide cymbiformes, bilobæ, lobulo inferiore paulo minore. Antheridia haud inveni. Dimensiones:— Folia ·7 × ·45, lobulus ·13, cellulæ mediæ ·03–·04; foliola ·25 × ·25; bracteæ lobus ·4 × ·15–·20, lobulus ·35 × ·10; bracteola ·3 × 15; perianthium ·9 × ·55 mm.

Hab. On shady rocks below Torc Waterfall, near enough the stream to be moistened by its spray, except when the water is very low. It grows chiefly on *Thamnium alopecurum*, accompanied by *Radula Carringtoni*, *Saccogyna viticulosa*, *Metzgeria conjugata*, and sometimes by *Lejeunea diversiloba* (*G. A. Holt*, June, 1855).

PLATE 272.—Fig. 1. Plants, natural size. 2. Portion of stem, slightly magnified, showing lateral perianths and male catkins. 3. Upper side of part of stem, more magnified. 4. Underside of ditto. 5. Single leaf. 6. Under-leaf. 7. Cells of leaf-apex. 8 and 9. Portion of stem, with a perianth, the underleaves removed to show the exact insertion of the female branchlet. 10. Section of perianth.

This fine species, entirely new to science, was found by Mr. Holt, of Manchester, during a visit to Killarney in the summer of 1885. It differs from every other European *Lejeunea* in the female flowers being borne on exceedingly short branchlets, which normally put forth no subfloral innovation, such as constantly exists in all our other species. Very rarely is there present a minute microphyllous innovation, springing from the base of the flower. In size it resembles *L. flava*, or luxuriant *L. serpyllifolia*, but usually differs at sight from both by the pale reddish tinge of the foliage. Even where the leaves are of the yellow-green of just-ripe limes, dried specimens speedily assume a rufous hue when moistened. Another important and unique character is afforded by the large pear-shaped perianths being so very strongly and sharply keeled that at first sight they seem broadly 5-winged. In some perianths, indeed, the sutures of the lateral keels are not so exactly valvular, but that one of the flower-lobes projects slightly beyond the other so as to form a limb, or rim, of a single cell in width. In other *Lejeuneæ* with very convex, or papulose, cells, a similar projection gives the keel a moniliate, or beaded, appearance (*e.g.* in *L. palmifolia* Nees, *L. minutissima* Sm., *L. inundata* Spruce, &c.), such as is not seen in *L. Holtii*, whose cells are nearly plane. The female flowers often alternate, or are variously mixed up, with male catkins of about the length of the adjacent leaf, and consisting of from two to five pairs of cymbiform bracts. Where inflorescences of both sexes are numerous, as they sometimes are, they render the stem or branch elegantly pinnulate.

The only species for which *L. Holtii* might be overlooked is *L. flava* Sw., which grows near it and in much greater abundance; but the former, although nearly equal in size, is far more delicate and pellucid, and its slight tinge of red is never seen in the yellow or green foliage of *L. flava*. The latter, besides the essential difference of the perianths being terminal on branches of various lengths, or on the main stem, and invariably putting forth from their base a leafy innovation, or even a pair of opposite innovations, each of which may in like manner bear an apical flower, subtended by a secondary innovation, differs also in the tufted habit, the imbricated leaves (which, although only slightly different in form, have smaller, more chlorophyllose cells), but, above all, in the much smaller, obtusely 5-carinate perianths: as compared with the large, deeply plicato-carinate perianth of *L. Holtii*.

Although *L. Holtii* stands alone among European *Lejeuneæ* by reason of its much-abbreviated and usually quite simple female branches, other species possessing the same character abound in tropical countries, especially in Equatorial America, and are found occasionally in groups which by their other characters stand widely

apart. Every true *Bryopteris*, and every species of the subgenera *Lopholejeunea* and *Acrolejeunea*, has perfectly simple female branches; in the first-named subgenus so short that the flowers appear sessile; in the two latter of various lengths. Short, uniformly simple, female branches are found also in a great many *Prionolejeuneæ*, *Trachylejeuneæ*, *Leptolejeuneæ*, *Cheilolejeuneæ*, &c. In some subgenera it is the rule to have an exceedingly short female branch, not, however, quite undivided, but invariably putting forth from beneath the flower a minute innovation, which does not flower again at its apex. Of this structure *Stictolejeunea* and *Platylejeunea* are notable instances; and the same is to be seen also in certain *Trachylejeuneæ*, *Leptolejeuneæ*, &c.* So that the peculiarity which to these latter groups is normal is to *L. Holtii* quite exceptional. Of all South American *Lejeuneæ* gathered by myself, or known to me from other regions, *L. Holtii* seems to stand nearest a small group, of which I have described three species under the name *Potamolejeunea*. These all grow in North Brazil, almost on the actual equator, and at only a few hundred feet above the sea-level, although nearly in the centre of the continent, about the roots of trees at the cataracts of the great rivers Negro and Uaupés, by the spray of whose waters they are perpetually irrigated, or are completely submerged for a short period at the height of flood. *L.* (*Potamolejeunea*) *polystachya* nob. (Hep. Am. et And. 250) is a stouter plant than *L. Holtii*, 1½–2 in. long, but has the same character of the stem pinnulate with flowers of both sexes, only they are much more numerous; the male catkins are two or three times as long as the leaves, and consist of 5–10 pairs of bracts each; the female ramuli are constantly simple, never innovating; and the perianths are sharply 4- (not 5-) carinate, the 5th (or antical) keel being reduced to a slight ridge. Both perianths and leaves are about the same size as those of *L. Holtii*, but the leaves are always widely rounded at the apex, and the lobule is twice as large as in *L. Holtii* and nearly plane (not inflated). In the other two species I have referred to the same subgenus the female flowers are very nearly sessile, yet have invariably a small subfloral innovation; and in their other characters they recede still further from our plant, especially in the form of the perianth, which is far more slightly keeled, and in one species (*L. temnantha* nob.) is truncate.†

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* See the introduction to *Lejeunea* in 'Hep. Am. et And.' pp. 63—81, and the detailed characters of subgenera that follow.

† When working up the Amazonian *Lejeuneæ* I was in doubt whether to make of these few species a subgenus apart, or to regard them a mere section of *Eulejeunea*. The elongate stems, pinnulate with nearly sessile female flowers, is their most salient difference from typical *Lejeunea* (*L. serpyllifolia* e. a.); and if the subgenus is to be maintained, it will be advisable to add to it (from *Eulejeunea*) *L. inundata* nob. (*op. cit.* 278, t. 10), which grows in company with all the other three *Potamolejeuneæ*, and has quite the same habit and character, except that the minute subfloral ramulus is sometimes again floriferous. We know now so many species of *Lejeunea* that, although many more forms doubtless remain to be discovered, it may be said there is hardly anywhere in the genus "a missing link." When, however, we attempt to divide this vast genus into natural sections, although the affinities are in most cases so marked that

Among the many fine hepatics gathered by Mr. Holt near Killarney, perhaps the most interesting, after *L. Holtii*, is the *Lejeunea* I have called *L. diversiloba*, n. sp. (Journ. Bot. 1876), and which has been described and figured by Carrington under that name in Trans. Bot. Soc. Edin. 1879. Mr. Holt's specimens are so much finer and more copious than any I had previously seen that I have profited by them to make a renewed analysis of the species, and to institute a rigorous comparison with its nearest allies. I must preface what I have further to say about it by a little bit of history. In the summer of 1842 I spent three weeks with Dr. Thomas Taylor at Dunkerron. My excursions thence were few and brief, comprising mainly an hour spent at Torc Waterfall, two hours at Cromaglown, and two hours on Mount Knockavohila. A few walks around Dunkerron completed the sum of my outdoor work. I had caught a severe cold on a stormy voyage from Liverpool to Cork, and a wet overland journey from Cork to Dunkerron, and was not equal to much exertion. Moreover, the fine spring weather was over, and the skies were mostly weeping. But I found enough to do in Taylor's herbarium, and was glad to make the acquaintance of exotic mosses, to all of which I had previously been an entire stranger. I was then a very young bryologist, well satisfied to see and gather rarities which till then I knew only from books or scanty specimens, and with no thought of making discoveries, especially on the hunting grounds of my lynx-eyed host. Some years later, when examining more carefully my Killarney *Hepaticæ*, I picked off a patch of *L. microscopica* a few stems of what I have since called *L. diversiloba*, and others of what Lindberg has described as *L. patens*;* and distinguished them both, the former from *L. ulicina*, the latter from *L. serpyllifolia*. The former was re-found in 1861 by Dr. Carrington, and referred by him to *L. minutissima*, as var. *major*, in the pleasant narrative of his wanderings in the South-west of Ireland.† At first I called it *L. cucullata* Nees, guided partly by the description in 'Syn. Hep.,' p. 767, and partly by comparing it with North American specimens published under that name by Sullivant in his 'Musci Alleghanienses,' No. 274, which, although not agreeing perfectly with the Killarney plant, so resembled it in size and general character that to my then unskilled eye the two might well seem forms of but one species. A Mexican *Lejeunea* given in 'Syn. Hep.,' *l. c.*, as *L. cucullata* β *stricta*, and affirmed by

there is no difficulty in grouping the species, there are yet in every group, and especially on its borders, forms which might equally well be attached to some other group; while the groups themselves have often multifarious relations with other groups. So that two equally conscientious observers would hardly ever hit on the same subdivisions, or make them exactly coterminous, even when they coincided as to the central and typical species of the principal groups. Nearly the same may be observed of the entire order; only in a very few cases are there wide breaks indicating that a great many forms must have fallen out of existence; and it is plain that of "new natural arrangements of *Hepaticæ*" there can be no end.

* "Hepaticæ in Hibernia lectæ a S. O. Lindberg." Helsingforsiæ, 1873.

† "Gleanings among the Irish Cryptogams." Trans. Bot. Soc. Edinb. 1863.

the authors of that work to be synonymous with Sullivant's No. 274, was afterwards (in 1863) published by Gottsche as *L. diversifolia*, n. sp. (Mex. Leverm. 227)—a name preoccupied by Mitten for a very different Indian species (Journ. Linn. Soc. 1860). Recently I have been able to examine an original Neesian specimen of his *L. cucullata*, as also Liebmann's Mexican specimens of *L. diversifolia* G., named by Gottsche himself. These establish the fact that *L. cucullata vera* is distinct from both the others above-mentioned; further, that "*L. diversifolia* G." is exactly the same species as *L. erectifolia* nob. Hep. Am. et And. 173, which I had gathered in fruit on the Rio Negro in 1853. The Mexican plant must therefore bear the latter name.

The "*L. cucullata*" of Sullivant is distinct enough from *L. erectifolia*. His specimens (from Cheat Mountain, Virginia) grew on rocks moistened by trickling water, and are much drawn out and quite flowerless. A more compact and perfect form of it, gathered in Florida by Miss Baddiscome, for specimens of which I am indebted to Dr. Carrington, proves to be exactly the same as *L. lucens* Tayl., gathered by myself in 1849 at Pará, near the mouth of the Amazon, where also the original specimens described by Taylor had been gathered, and not at Cincinnati (Ohio) as he supposed. (*Cf.* Lond. Journ. Bot. 1846, and Syn. Hep. *in loco*). The Pará plant is shorter and more branched, and the stem-leaves are wider; yet long slender branches, with narrower and often elobulate leaves,—quite like those of Sullivant's plant,—are also present not unfrequently, as they are also in the Florida plant.*

Wishing to place on record what I conceive to be the chief characters of *L. diversiloba* and of its nearest allies, I add here a brief description of them. They all belong to the group I have called, in my 'Hepaticæ of the Amazon and Andes,' *Microlejeunea*, which agrees with *Eulejeunea* in the unarmed perianth, constantly subtended by an innovation, the bilobed stipules, the entire margin of the more or less obtuse leaves, &c.; but differs in the minuteness of all the parts, the leaf-cells being only half the diameter of those of *Eulejeunea*, and in the dioicous inflorescence which prevails, with rare exceptions, throughout the group; whereas nearly all *Eulejeuneæ* are monoicous. Of course these differences are merely sectional, but it is convenient to keep such a natural group apart, even if only as a section of *Eulejeunea*.

1. L. ERECTIFOLIA Spruce.—Monoica, minuta, caule 2 lineas longo, subpinnato. Folia subcontigua, erecta (axi cauli parallelo) oblonga, basi apiceque rotundata, recte complicata, ad carinam e cellulis extantibus moniliato-papulosa, lobulo lobo æquilato duplo breviore, turgido, apiculato; cellulæ præminutæ (·0125 mm.) leptodermes prominulæ. Foliola triplo minora, ovali-orbiculata, pellucidissima, ad medium bifida, segmentis acutis. Bracteæ foliis paulo majores, obovatæ obtusæ, lobulo duplo breviore lineari acuto; bracteola obovata breviter bifida, segmentis obtusis. Perianthia

* Sullivant, in the last edition of the 'Musci and Hepaticæ of the U. S. east of the Mississippi,' gives *L. lucens* T. as a synonym of his "*L. cucullata*," which it certainly is, but not of Nees's *L. cucullata*.

maxima, foliis triplo longiora, pyriformia, subcompressa, 5-carinata, carinis lævibus. Andrœcia in ramis terminalia; bracteæ 3–5-jugæ subrotundæ asperulæ.—*Harpalejeunea erectifolia* Spruce, Hep. Am. et And. 173.*— *L. diversifolia* Gottsch.! Mex. Leverm. 227 (*nec* Mitt. Hep. Ind. Or.).

Hab. Brasilia borealis (*R. Spruce*, anno 1853). Mexico (*Liebmann!*).

2. L. ULICINA Tayl.— Dioica, minuta, $\frac{1}{4}$–$\frac{1}{2}$ poll. longa, vage ramosa. F. dissita vel subcontigua, suberecta (axi angulum 10°–30° cum caule formante) rotundo-ovata cochleato-concava, apice angustiore obtusa vel abrupte acuta, lobulo plus minus breviore vix æquilato, turgido, margine plano vel incurvo, apice apiculato-acuto; cell. minutulæ (·017 mm.) convexulæ. Foliola foliis triplo breviora, ovalia, ultra $\frac{1}{2}$ bifida, segmentis lineari-subulatis, inferne 2 cell. latis, sinuque subobtusis. Bracteæ maximæ, foliis triplo majores, inter se subdivergentes, planæ, complicato-bilobæ, interdum subdenticulatæ, lobo obovato acuto, lobulo subbreviore semilanceolato; bracteola ovali-lanceolata, ad $\frac{1}{4}$ bifida, segmentis acutis. Perianthia pyriformi-oblonga, præter ad apicem valde obtuse 5-angulum teretia, ecarinata. — *Jungermannia ulicina* Tayl. Trans. Bot. Soc. (1841).—*Lejeunea ulicina* ejusd. in Syn. Hep. (1845); Spruce in Journ. Bot. (1881).—*Jungermannia minutissima* Hook. Br. Jung. t. 52 ex p. et *Lejeunea minutissima* Spruce in Ann. Nat. Hist. (1849) nec Smithii).

Hab. Insulæ Britannicæ et Gallia occidentalis.

3. L. DIVERSILOBA Spruce. — Dioica et monoica, pusilla, caule elongato interdum pollicari, paucirameo ramisque strictis subfastigiatis filiformibus æquifoliatis. F. subcontigua suberecta (angulo axillari sub 30°), oblique obovato-oblonga rotundata, rarius obtusa subacutave, dimidio infero complicato-biloba (vel non); lobulus lobo subæquilatus subinflatus, ad carinam late rotundatus, margine supero ascendente incurvulo, apice acuto, interdum obsoletus; cell. fere minutæ (·015 mm.) subplanissimæ pellucidæ. Adveniunt rarius folia ad sacculum basalem fere redacta, apice lobi majoris omnino adempto. Foliola foliis 4-plo breviora, caule vix latiora, subrotunda, ultra $\frac{1}{2}$ acute bifida, segmentis suberectis subacutis. Bracteæ foliis sublongiores, suberectæ, laxe complicatæ, ultra $\frac{1}{2}$ bilobæ, lobo oblique obovato-lanceolato subacuto, lobulo fere æquilongo ligulato; bracteola obovato-lanceolata ultra $\frac{1}{2}$ bifida, segmentis angustis acutis. Perianthia involucro immersa, subglobosa, haud compressa, alte 5-carinata, lævissima. Andrœcia ramulis brevibus constantia; bracteæ bijugæ, foliis majores, turgidissimæ, subæquilobæ, lobis fere hemisphæricis, diandræ. — *L. diversiloba* nob. in Journ. Bot. (1876), "On *Anomoclada*," in adnot. ad finem.—*L. minutissima* var. *major* Carringt. Irish Gleanings, &c. — *L. diversiloba* Spruce, ejusd. Trans. Bot. Soc. 1849, p. 461, pl. 17.

Hab. Torc Waterfall, Killarney (*R. Spruce*, 1842; *Carrington*, 1860; *Holt*, 1885).

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* In this work I placed *L. erectifolia*, doubtfully, in *Harpalejeunea*, with the remark, "melius forsan cum *Microlejeunea* collocata," which is doubtless its true place.

4. **L. concinnula** Spruce et Steph., n. sp.— *L. diversilobæ* persimilis, eadem magnitudine, magis ramosa tamen, caule inordinatim pinnato, ramis late patentibus concinnatim foliatis. F. dissita, rarius contigua, plano-disticha, suberecta (angulo axillari 15°–30°) oblonga vel ovali-oblonga, rotundata rarius obtusata, semper fere elobulata, raro subrecte complicato-biloba, lobulo triplo breviore ovato-rhombeo subapiculato, inflato, ad carinam rotundato; cell. minutæ (·014 mm.) subplanæ, primum chlorophyllo opaculæ, demum vacuæ. Foliola præminuta, foliis 4–6-plo minora, oblongo-rotunda, ad $\frac{1}{2}$ obtuse bifida, segmentis acutis obtusisve. Bracteæ foliis parum majores, lobo oblique obovato-lanceolato obtuso, lobulo multo minore triangulari subulato; bracteola ovali-lanceolata ad $\frac{1}{2}$ fere bifida, segmentis acutis. Perianthia . . . . .

Hab. Venezuela (*Fendler* in hb. Stephani).

5. **L. cucullata** Nees! ined. (ex ipso in hb. Hook.). — Dioica, pusilla, parce et subfastigiatim ramosa. F. subimbricata vel dissita, inferiora erectiora et breviora, superiora majora, patentia (angulo axillari sub 70°) ovato-rotunda vel subobovata, decurvula, medio subrecte complicata; lobulus semper præsens, lobo duplo brevior et angustior, turgide ovatus ad carinam rotundatus (explicatus autem subrhombeus) apice acuto apiculatove; cellulæ subminutæ (·015 mm.) subincrassatæ planiusculæ. Foliola foliis duplo breviora, ovali-rotunda, ad $\frac{1}{2}$ bifida, segmentis subobtusis, basi 3 cell. latis. Bracteæ foliis duplo longiores, erectæ, complicatæ, lobo oblique oblongo obtuso, lobulo sat breviore lineari-rhomboideo; bracteola ovalis vix ad $\frac{1}{2}$ bifida, segmentis lanceolatis. Perianthia . . . . .

Hab. Java (*Reinwardt*!).

6. L. LUCENS Tayl.! — Dioica pusilla albicans tenera, vage vel pinnatim ramosa, ramulis sæpe parvifoliis. F. dissita, raro subimbricata, angulo 60° patentia, subplana, oblique ovato-subtriangularia, rotundata obtusatave, basi subsemicordata, subrecte complicata; lobulus 2–3-plo brevior, subsaccatus, ovoideus, acutus apiculatusve, haud raro obsoletus; cell. parvæ (·02 mm.) leptodermes pellucidæ. Foliola foliis plus duplo breviora, ovali-rotunda, interdum utrinque medio unidentata, apice ultra $\frac{1}{2}$ bifida, segmentis late subulatis subacutis. Bracteæ foliis sublongiores, erectæ, subæquilobæ, lobis lanceolatis; bracteola ovali-lanceolata acutiloba. Perianthia vix emersa, late pyriformia subcompressula 5-carinata. Folia ramulorum subinde angustiora, ovalia vel sublanceolata, sæpius elobulata.—*L. lucens* Tayl. Lond. Journ. Bot. (1846), ejusd. Syn. Hep. p. 764; Spruce, Hep. Am. et And. 288 (1885).

Hab. Pará, juxta fl. Amazonum ostia (*R. Spruce*, a. 1849, etiam *T. L. R.* in hb. Hook.). Florida (*Austin*! in hb. Carrington). Taratopo, Andium Peruviæ: forma minor angustifolia (*R. Spruce*, 1853). Eadem videtur "*L. cucullata*" Sull. Musc. Allegh. No. 274, a cl. auctore cum *L. lucente* Tayl. synonyma recte æstimata.

(To be continued.)

A LIST OF PLANTS OBSERVED IN S. DERBYSHIRE.

By the Rev. W. H. Purchas, L.Th.

I have thought that it may be well to put on record a list of the plants which I observed and noted down during the few years (1858–1865) which I passed in the South of Derbyshire; for although so much has been written on Derbyshire Botany, I do not think that an approximately complete list of plants has been published for the restricted area which came under my own observation; and if the county should be hereafter mapped out into a greater number of botanical districts than hitherto, with a view to more thorough investigation, the following list of plants may be taken as fitting into such a scheme, seeing that the tract to which it refers is not likely to form part of more than one botanical division or district.

South and east of the River Trent the County of Derby runs down as a tongue between the counties of Stafford and Leicester, and it is only to the northern half of this tongue that the present records apply; a line from Burton-on-Trent to Smisby, near Ashby-de-la-Zouch, will give the southern limit of my explorations, as the Trent does the northern, and even of this restricted tract the outlying portions will necessarily have been less fully examined than those immediately around Calke and Tickenhall.

The geology of this part is varied and interesting, but I must leave any description of it to those who know more about the matter than I do. I will only observe that the most noticeable feature in respect of the relations between plants to the subjacent rocks is the very marked absence of limestone plants from the carboniferous limestone of Tickenhall and Calke. My valued friend the Rev. W. H. Coleman, who was as acute and accurate a geologist as he was a botanist, used to offer in explanation the great probability (almost certainty) that a very small portion only of the Tickenhall limestone was originally exposed at the surface, the greater portion of the rock having been covered by more recent deposits. These deposits had to be removed in order to get at the limestone, and were thrown up into the large mounds and hillocks which occupy the lower end of the Tickenhall Lime-works.

Some few species are here, I think, recorded for the first time for South Derbyshire; but the majority were long since noted by the Rev. A. Bloxam, who, during the time he was at Calke, and which seems to have ended in the year 1833, must have explored the neighbourhood most diligently. Mr. Bloxam communicated the results of his observations to the late Mr. H. C. Watson, by whom the rarer plants were published in his 'New Botanist's Guide' (1835), and more especially in the Supplement. On leaving Calke Abbey, Mr. Bloxam placed in the hands of the then Lady Crewe a collection containing a specimen of almost every species observed by him. This collection was carefully preserved by Lady Crewe, and is now in the possession of her grandson, Mr. Hugo H. Crewe, by whose kindness I have been able to go carefully through it, and

examine at leisure any species about which I was in doubt. The results are incorporated in this paper.*

Mr. Bloxam's collection makes it evident that various species have disappeared from the neighbourhood, more especially from Calke Park; for such have long ceased to be met with, although clearly existing in Mr. Bloxam's time.

In the case of Calke Park the browsing and trampling of the deer have no doubt contributed much to the exterminating of plants. I have in the following list included all such of Mr. Bloxam's species as are vouched for by specimens, adding comment where it seemed needful.

Mr. Baker has, in his paper (Journ. Bot., Jan. 1884), called attention to the special interest which attaches to Derbyshire Botany; and it is much to be wished that a really good Flora of the county may eventually be given to us. Whilst, however, so many parts of the county, and especially on its eastern side, have been but very imperfectly explored, this is rather to be wished for than expected. The botanist who undertakes it will require not only an accurate acquaintance with British plants, but plenty of leisure and bodily activity for exploring the imperfectly examined districts; in addition to which he will require a good knowledge of the past history of British Botany, or he cannot expect to succeed in disentangling the true from what is erroneous in the older records. Meanwhile I hope the present list may render some little help towards the desired object. It was at first drawn up without any view to publication; the plants were, in fact, set down as I met with them, simply as a matter of interest to myself.

Thalictrum flavum L. "Near Swarkestone Bridge," *Bloxam*! I did not myself meet with this species.

Anemone nemorosa L. Common in woods and plantations, sometimes with purplish pink flowers.

Ranunculus circinatus Sibth. In a small reservoir or pond at the upper end of Dimminsdale, Calke. I also think I have seen it in the ornamental water in Melbourne Gardens.—*R. Drouetii* Godr. Shallow ditches by the side of the tramway at Tickenhall, *teste* Boswell-Syme. — *R. peltatus*, var. *floribundus*. In pools at Tickenhall; and at the Dimminsdale Lime-yard, Calke, *teste* Boswell-Syme. —*R. Lenormandi* F. Schultz. Very rare. It occurred in very small quantity in a roadside ditch between Calke and Melbourne, evidently as a remnant of the ancient vegetation of Melbourne Common, which the road in question there crosses. The drainage of the ground, which slopes downward to the road, had doubtless brought with it this plant. Unfortunately it was destroyed by the trampling of the animals which used to drink at the spot, and it did not reappear. *R. Lenormandi* is especially a moorland species, making its appearance where wet and springy places occur, or in the shallow ditches of the imperfectly reclaimed moors of Derbyshire and Staffordshire. In a mild winter it will often be in full

* Mr. Painter's "Notes on the Flora of Derbyshire" (Journ. Bot. 1881) record most of these species, and in many instances from the very localities.

flower in December or January; I have not observed the same thing in *R. hederaceus*. — *R. hederaceus* L. By the tramway near Tickenhall.— *R. sceleratus*, *R. Flammula*, *R. reptans*, *R. auricomus*, *R. acris*, *R. repens*, and *R. bulbosus*. Common. — *R. arvensis* L. Rare. I did not myself meet with it, but Mr. Bloxam's collection has a specimen found at the Tickenhall Lime-works, the seed perhaps having been brought with fodder for the horses. — *R. Ficaria* L. Everywhere.

Caltha palustris L. Boggy plantation at Calke and elsewhere.

Aquilegia vulgaris L. Very rare, and long extinct. Once met with by Mr. Bloxam at Calke!

† *Berberis vulgaris* L. Mr. Bloxam's collection had a specimen, but without locality.

† *Nuphar lutea* and *Nymphæa alba*. Abounding in the ponds in Calke Park, where they have no doubt been originally planted.

Papaver Rhœas L. Corn-fields. — *P. dubium* L. (*Lamottei*).— *P. Argemone* L. Rare. Tickenhall fields.

† *Chelidonium majus* L. Calke Village; doubtless introduced.

Fumaria officinalis L. Cultivated ground.

Nasturtium officinale Br. Near Calke Abbey. — *N. amphibium* Br. Sides of ponds at Calke.—*N. palustre* DC. *Bloxam*! Station not given.

Barbarea vulgaris R. Br. Side of pond in Gill's Park, Tickenhall.

Arabis perfoliata Lam. Banks between Tickenhall and Hartshorne, and between Tickenhall and Milton. These stations, taken in connection with the Rev. Churchill Babington's locality of "Bretby," N. Bot. Guide (Suppt.), show that this plant is thinly scattered over an area of several square miles of the light sandy soils of the New Red Sandstone. Mr. J. T. Harris's station, "Drakelowe," as given by Mr. Painter, extends the range still farther to the S.W. Avoids limestone.

Cardamine amara L. About the margin of ponds in Calke Park, and on the banks of Springwood Brook.—*C. pratensis* L., *C. hirsuta* L., and *C. flexuosa* With. Common.

Erophila (*Draba*) *vulgaris* DC.

Sisymbrium Thaliana Hook. Dry banks on millstone-grit at Melbourne. — *S. officinale*. — † *S. Sophia* L. A garden weed at Tickenhall.—*S. Alliaria* Scop.

Brassica Sinapis Visni. (*Sinapis arvensis*). Cultivated land.

Capsella Bursa-pastoris Mœnch.

Senebiera Coronopus Poir. Calke, *Bloxam*! I never met with this or the following; they are certainly rare in the district.

Lepidium campestre R. Br. Calke, *Bloxam*!

Reseda luteola L. Tickenhall Quarries.

Viola palustris L. Sides of Springwood Brook, Calke; also bog near Foremark Park, *Bloxam*! Apparently the same station as "Repton Rocks, *Playne*" of Mr. Painter's 'Notes.' — *V. hirta* L. Tickenhall. This and *Poterium Sanguisorba* and *Reseda Luteola* are almost the only limestone-loving plants which occur at Tickenhall, and these have by no means an exclusive preference for limestone. — *V. sylvatica* Fries (*V. Riviniana*). Very common. — *V. Reichen-*

bachiana not observed. This latter is a plant of West Derbyshire, although of restricted area.—*V. tricolor*, var. *arvensis* Murr. Cornfields and cultivated ground.

Polygala vulgaris L. Common.

Silene Cucubalus Wibel. I do not seem to have noticed this, but Mr. Bloxam's collection has a specimen located from "Ticknall." —*S. noctiflora* L. White Lees, Tickenhall.

Lychnis alba Mill., *L. diurna* Sibth., and *L. Githago*, Lam.

Cerastium semidecandrum L. Exact locality not noted, but I think it was near Melbourne. — *C. glomeratum* Thuil. — *C. triviale* Link.

Stellaria aquatica Scop. *Bloxam*! I did not meet with it.—*S. media* Cyr., *S. Holostea* L., *S. graminea* L., and *S. uliginosa* Murr. —*S. palustris* Ehrh. (*S. glauca*). "In the meadows below Repton, *Bloxam*! The specimen is very poor and unsatisfactory, but it seems rightly named, and is placed side by side with an undoubted one from Grotby, Leicestershire, so that Mr. Bloxam evidently knew the species. It is remarkable, however, that no other botanist should have met with it near Repton. Confirmation is much to be desired before recording it as an undoubted Derbyshire species.

Arenaria trinervia L.—*A. serpyllifolia* L. Walls, &c.—True *A. leptoclados* not noticed; but at Bredon, Leicestershire, about a mile beyond the county boundary, I met with both the var. *sphærocarpa* and also with what is extremely near to *A. leptoclados*, and I think ought to bear the name of that var.

Sagina apetala L. and *S. procumbens* L.

Lepigonum rubrum Fr. On walls, but very scarce. Milton, and near Foremark.

Hypericum perforatum L., *H. quadratum* Stokes (*quadrangulare* Sm.), *H. humifusum* L., and *H. pulchrum* L. — *H. hirsutum* not noticed, although it occurs in Springwood, just over the county boundary.

Malva moschata. Dimminsdale, Calke; and also at Stanton-by-Bridge. — *M. sylvestris* L. and *M. rotundifolia*. Both "near Calke," *Bloxam*!

Tilia platyphyllos Scop. (*T. grandifolia*) and *T. cordata* Mill. (*T. parvifolia*). The former certainly planted, the latter probably so in Calke Park.

Linum catharticum L. Common.

Geranium pratense L. Occasionally in meadows.— *G. molle*, *G. pusillum*, *G. dissectum*, and *G. Robertianum*.—*G. lucidum* L. Rocks at Anchor Church, near Foremark, *Bloxam*! Also doubtfully wild on the garden-wall of a farm-house on Pistern Hill.

Erodium cicutarium L'Hérit. Near Calke Abbey, *Bloxam*! Not seen by me, but easily overlooked.

Oxalis Acetosella L. Plentiful in shady plantations.

Ilex Aquifolium L. Woods and hedges.

Rhamnus Frangula L. Bog at Repton Rocks.

Acer campestre L. Woods, &c.—*A. pseudo-platanus*. Planted.

Ulex europæus L. and *U. Gallii*. Rough ground.

Cytisus scoparius Link. Dimminsdale, Calke; also Melbourne.

Ononis spinosa L. Tickenhall.

Medicago lupulina L.

Melilotus altissima Thuill. (*M. officinalis* Willd.). By the tramway at Tickenhall, most probably introduced.

Trifolium pratense L., *T. repens* L., *T. procumbens* L., and *T. dubium* Sibth. (*minus* Smith).— *T. medium* L. Scarce. A solitary plant found by me on a hedge-bank on Pistern Hill; found also near the Tickenhall Lime-works by me, and by Mr. Bloxam at Calke!—*T. arvense* L. Near Foremark, *Bloxam*!

Anthyllis Vulneraria L. Very scarce. For several seasons I noticed a solitary plant in an old stone-pit near Tickenhall; a second plant afterwards appeared, and these two weakly plants were all I saw of the species in that district.

Lotus corniculatus. Dry pastures and rocky places. —*L. major*. Sides of ditches, &c.

Ornithopus perpusillus L. Hill above Repton, *Bloxam*!

Vicia hirsuta Koch, and *V. tetrasperma* Mœnch. "Near Calke Abbey," *Bloxam*!—*V. cracca* L. Meadows.—*V. sepium* L. Bushy places.—*V. angustifolia*, var. *Bobartii* Forster. Dimminsdale, Calke.

Lathyrus pratensis L. Meadows. — *L. macrorrhizus* Wimm. Heathy banks; scarce.

(To be continued.)

A NEW *POLYPODIUM* FROM JAMAICA.

By J. G. Baker, F.R.S.

We have just received through Mr. Morris a new *Polypodium* from Jamaica, which, as Mr. Jenman intends to publish shortly a handbook of the West Indian Ferns, I had better place on record now. It was gathered by Mrs. Baker, wife of Capt. Baker, Ordnance Department, Tweedside, Jamaica, now of Devonport.

184* **Polypodium** (Eupolypodium) **microchasmum**, n. sp.—Rhizome short-creeping, only seen in a young condition. Stipe 1½–2 in. long, winged down to the base, furnished with a few small membranous linear or lanceolate brown paleæ, tinged bright brown, as is also the rachis. Lamina oblong-lanceolate, glabrous, simply pinnate, 6–8 in. long, 2 in. broad at the base, moderately firm in texture, green on both surfaces. Pinnæ 15–16-jugate below the pinnatifid apex, lanceolate, subobtuse, broadly adnate at the base, obscurely serrated, ⅙ in. broad at the middle, the lowest the largest, all but the lowest contiguous. Veins free, obscure, erecto-patent, forked, ending in a knob distinctly within the margin. Sori uniserial, medial, globose, distinctly immersed, 8–10-jugate in the lower pinnæ.

Allied to *P. vulgare* and the Mexican *P. fraternum* and *P. Martensii*.

JAMAICA MOSSES AND HEPATICÆ.

By Henry Boswell, M.A.

During the earlier months of 1886 Mr. W. Joshua forwarded to me for identification three or four parcels of Mosses and Hepaticæ, collected in the neighbourhood of Gordon Town by Mr. Hart. They comprise a number of interesting and beautiful species, several of them apparently not before known to be natives of Jamaica, although recorded from other parts of South America or the Islands, as Venezuela, Guadaloupe, Cuba, &c., with one *Scapania* that may be new altogether. Hence it is evident that the cryptogamic treasures of the "Land of wood and water"* are by no means exhausted, but rich, copious, and varied, leaving room to hope for yet further novelties; although many travellers have paid attention to them from the time of Swartz down to recent years, a period of nearly a century.

There exists, I believe, no complete or general list of Jamaica species, and the number recorded in Jaeger and Sauerbeck's 'Adumbratio Muscorum' is probably far below what would be found if anything like a continuous and systematic search were made. The species enumerated in the following list include representatives of most of the principal tribes or suborders of mosses, *Sphagnacea* not excepted, indicating great variety; the genus *Macromitrium* being especially well represented, and *Leucobryum* conspicuous in the presence of four species all in fair quantity, showing that they grow freely and fine; two of these latter rival in size and beauty the oriental *L. falcatum*, but all four have been recorded from Jamaica long ago. Attractive beyond even these are the mosses belonging to the *Neckeradæ* and *Hookeridæ*, groups abounding in the tropics and in the present collection represented by some of the most striking species—*Meteorium*, *Phyllogonium*, and *Hookeria undata*.

Several of the *Hepaticæ* are also very fine and handsome, especially *Plagiochila* and *Mastigobryum*. The presence of a *Scapania* at once struck me as very remarkable, no species of this essentially northern genus having ever, so far as I knew, been recorded from the Southern American Continent or West Indian Islands; but since writing out the list I have received Dr. Spruce's elaborate and complete 'Hepaticæ of the Amazon and Andes,' and therein find described a *Scapania* gathered in the Quitenian Andes by himself, which is evidently very near to the Jamaica one, and may possibly prove identical with it. Without actual comparison of specimens it is scarcely possible to determine.

The names and arrangement followed are those of Jæger and Sauerbeck's 'Adumbratio Muscorum,' Mitten's 'Musci Austro-Americani,' and the 'Synopsis Hepaticarum'; in an article like the present it seems unnecessary to introduce the new system of arrangement and nomenclature, which will be found fully set forth

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* Xaymaca, the native name.

in Dr. Spruce's work above alluded to—a work admirable for industry and research, which should be in the hands of all students of the tribe, whatever opinions we may hold as to the necessity of the changes and the substitution of such meaningless terms as *Bazzania* for the classic and familiar *Mastigobryum*.

The species having an asterisk prefixed are here first recorded for Jamaica, and are thirty-eight in number, thirteen of them being *Hepaticæ*.

Sphagnaceæ.

*1. *Sphagnum pulchricoma* C. Mull. Synops.; Mitt. Mus. Aust. Amer. *S. squarrosum* Hornsch. -- A Brazilian species, having exactly the aspect of large forms of *S. recurvum* Beauv.

Acrocarpi.

*2. *Weissia Breutelii* C. Mull. Synops. *Gymnostomum* Br. & Sch.; Mitt.—St. Thomas.

3. *Cynodontium Bogotense* Hampe in Linnæa. *Trichostomum strictum* Schwg. *Cynontodium* Mitt.—This has entirely the aspect of *Leptotrichum*, and closely resembles *L. pallidum* Hedw., one of those mosses which, while present in North America and Germany, are absent in Britain.

4. *Angstræmia vulcanica* Brid. (*Dicranum*). *D. filiforme* Schwg. *D. filum* Bory.—In fruit, which appears to be new to the island, as Mitten remarks of the Jamaica specimens he had seen "without fruit, but agreeing in other respects with Beauvais' specimens from the Isle of Bourbon in Herb. Hooker," as also do the present ones.

5. *Campylopus porphyreodictyon* C. Mull.—A few detached plants amongst *Mastigobryum*.

*6. *C. proliferus* C. Mull. (*Dicranum*) Synops. Muscorum, ii. 602; Mitt. Mus. Austr. Amer.—No fruit, but both male and female plants in distinct tufts. C. Muller's description is so exact as to leave no room for doubt. Venezuela.

*7. *C. Richardi* Brid. *Thysanomitrium* Schwg. *Dicranum* C. Mull. Synops.—Andes; Guadaloupe.

8. *Pilopogon gracilis* Brid. *Didymodon* Hook. Mus. Exot.

9. *Holomitrium calycinum* Swartz; Hedw. Species Muscorum, t. 14.—This seems restricted to Jamaica hitherto.

*10. *Fissidens circinans* Schimp.; C. Mull. in Botanische Zeitung; Mitt. Mus. Aust. Amer. 586.—This resembles *F. adiantoides* of Bryol. Europ. and Bryol. Brit. (*F. majus* Mitt. in Journ. Linn. Soc.) in size and aspect, and might easily pass for it at sight; but differs in the inflorescence and the areolation of the leaves. Mexico.

11. *Leucobryum glaucum* (L.) Hampe. -- Without fruit; apparently not differing from the ordinary British plant.

12. *L. longifolium* Hampe; C. Mull. Synops. *L. albicans* Lindb. —Very fine and handsome, but barren.

13. *L. megalophyllum* Raddi; Mitt. *L. giganteum* C. Mull. *L. robustum* Sulliv.—In large dense tufts.

14. *L. crispum* C. Mull. Synops. i. 78. *L. Martianum* Hampe in Linnæa; non Hornsch.

15. *Octoblepharum albidum* Hedw.—One of the most general and widespread of tropical mosses, apparently abundant in Jamaica, whence it is frequently sent.

*16. *O. pulvinatum* Dozy & Molk. — A solitary tuft on a piece of rotten wood. St. Vincent; New Granada.

17. *Trichostomum Jamaicense* Mitt. *Tortula* Mus. Austr. Amer. p. 147.—Exactly agreeing with Mitten's description, except in being considerably taller.

18. *Tortula Crugeri* Sonder; Mitt. p. 150.—Barren, and hence doubtful, but agrees with the description as to the leaves.

19. *Syrrhopodon lycopodioides* Brid.; Swartz. — A large species frequent in the West Indian Islands.

*20. *Zygodon subdenticulatus* Hpe. — A few scraps among other things seem certainly to belong to this species. Andes of New Granada; Guadaloupe, &c.

*21. *Schlotheimia elata* Mitt. Mus. Aust. Amer. p. 225.—Recorded before for Brazil alone.

22. *S. torquata* Brid.—Some fragments of another *Schlotheimia* appear to belong to *S. nitida*; also a Brazilian species, but not well known to me, and they are too imperfect for satisfactory identification.

23. *Macromitrium cirrhosum* Brid.
24. *M. stenophyllum* Mitt.
25. *M. Jamaicense* Mitt.
26. *M. stratosum* Mitt.
*27. *M. longifolium* Brid.—Brazil; Columbia; Gallapagos Isles.
28. *M. scoparium* Mitt.
29. *M. pralongum* Mitt.
*30. *M. pyriforme* C. Mull.—Venezuela. The last ten were more or less mingled together, *M. cirrhosum* forming the larger part of the mass.

31. *Bartramia tomentosa* Hook. Mus. Exot.
32. *B. Jamaicensis* Mitt.
*33. *Bryum Beyrichianum* Hornsch.—Andes; Brazil. The specimens exactly accord with others from Brazil: the leaves are larger than in *B. roseum*, shrinking much when dry.
*34. *B. grandifolium* Tayl. In perfect fruit; the specimens might pass for *B. roseum*. Andes of Quito and New Granada.
35. *Mnium rostratum* Schwg.—Longer and more straggling than European forms, but otherwise not seeming to differ.
36. *Rhizogonium spiniforme* Brid.
*37. *Atrichum Oerstedianum* C. Mull.—Costa Rica.
38. *Pogonatum tortile* Swartz.
39. *P. robustum* Mitt.
40. *Polytrichum aristiflorum* Mitt.

Pleurocarpi.

41. *Prionodon densus* Swartz. (*Hypnum*). *Pilotrichum* C. Mull. Synops.
42. *Pilotrichum hypnoides* (Sw.) C. Mull. *Fontinalis* Swartz, Prodromus.

43. *Meteorium patulum* Sw. (*Hypnum*).

*44. *Pilotrichella quinquefaria* C. Mull, (*Neckera*). *Meteorium quinquefarium* Mitt.—Central America; Trinidad.

*45. *P. flexilis* Swartz (*Hypnum*). *Meteorium flexile* Mitt.—Venezuela; Brazil; New Granada.

46. *P. leucotricha* (Tayl.) *Hypnum* C. Mull. Synops. ii. 319. *Neckera rufescens* C. Mull. Synops. ii. 134.—A solitary stem.

47. *Papillaria nigrescens* Swartz. (*Hypnum*). *Meteorium* Mitt.

48. *P. funalis* Wils. (*Pilotrichum*). *Meteorium* Mitt.

49. *Phyllogonium aureum* Mitt. — In tufts nearly two feet long. This fine neckeroid moss seems abundant in Jamaica; it has lately been sent by two other correspondents; but there is no fruit with either specimen, though plenty of female flowers.

50. *Homalia glabella* Swartz (*Hypnum*). *Neckera glabella* C. Mull. Synops.

51. *H. lentula* Wils. Annals of Nat. Hist. vol. xx. 1847; C. Mull. Synops.—This species is omitted in the 'Musci Austro-Americani,' apparently by mistake; it is a large and handsome moss, intermediate in size between our native one and the oriental *H. Javanica*, &c.

52. *Lepidopilum diaphanum* Mitt. *Hypnum* Swartz.

53. *Hookeria albicans* Sw.

54. *H. Antillarum* Mitt.

55. *H. undata* (Hedw.) C. Mull. (*Hookeriopsis*). — One of the most beautiful of the tribe.

56. *H. fissidentoides* Hook. & Wils. — Growing mixed with *H. albicans* on bark.

*57. *H. Guadalupensis* (Brid.) C. Mull.—Guadaloupe.

*58. *H. filiformis* Hook.—Guadaloupe; St. Vincent.

*59. *H. leptorhyncha* Hook. & Grev. *H. cupressiformis* C. Mull. Synops.—One small patch, having very much the aspect of some slender forms of *Hypnum cupressiforme*. Trinidad; St. Vincent.

60. *Adelothecium Bogotense* (Hampe) Mitt.—A few fragmentary stems.

61. *Thuidium Wrightii* Jaeger. *T. minutulum* Mitt. (non Hedw., Schimp.).

*62. *T. pusillum* Mitt.—Venezuela; Caraccas.

63. *T. involvens* Pal. Beauv.

64. *T. acuminatum* Mitt.

65. *Eurhynchium Regnellii* Hampe; C. Mull. *Hypnum remotifolium* Mitt. Mus. Austr. Amer.

66. *Sematophyllum pungens* (Hedw.) Mitt.

*67. *S. admistum* (Sull.) Mitt.—Cuba.

68. *Raphidostegium Galipense* C. Mull.

*69. *R. insulosum* Sull. (*Hypnum*).—Cuba; Brazil.

*70. *R. aristrostegium* Sull.—Cuba.

71. *Microthamnium reptans* (Sw.) Mitt.

*72. *M. Langsdorfii* (Hook.) Mitt.—Brazil; New Granada, &c.

73. *Isopterygium planissimum* Mitt.

74. *Ectropothecium globitheca* C. Mull. *Hypnum* Synops. vol. ii. p. 300.

75. *E. polypterum* Mitt.
76. *E. apiculatum* Hornsch.
*77. *E. Cubense* C. Mull.—Cuba.
*78. *Leucomium flexuosum* (Sull.) Mitt.—Cuba.
79. *Racopilum tomentosum* Brid.
80. *Hypopterygium tamarisci* Brid.

Hepaticæ.

These pretty plants rejoice even more than the mosses proper in the moist shelter of "wood and water," and seem to abound in the island. Some of the following are very fine; others, *Lejeunia* especially, morsels found amongst larger things, and very difficult to identify:—

81. *Plagiochila patula* Nees.
82. *P. distinctifolia* Lindenb.
*83. *P. tenuis* Lindenb. — Cuba; Sandwich Islands, &c. The last two were mixed with a tuft of *Selaginella*.
*84. *P. bursata* Lindenb.—Martinique; Guadaloupe, &c.
85. *P. adiantoides* (Sw.) Lindenb.—Fine plants with numerous male spikes, resembling *P. macrostachya*.
*86. *P. superba* Nees.—Bolivia; Trinidad; Mauritius.
*87. *P. approximata* Lindenb. — Mingled with *Hookeria Guadaloupensis*. This, like some others of Lindenborg's species, evidently requires removal: it seems to be a *Tylimanthus*.
*88. *P. abrupta* Lehm. & Lind.—St. Vincent.
89. *P. bifaria* Lindenb.—A few scraps only of this small species.
*90. *P. heteromalla* Lehm. & Lind. — Andes of Chili and Peru; St. Christopher.
*91. **Scapania grandis** Bosw., n. sp. — Caulis elongatus, tripollicaris, rigidus, nigricans, sparse ramosus. Folia magna, fulva, subimbricata, marginibus spinuloso-denticulatis; lobus inferior major horizontaliter patens, elliptico-oblongus obtusus, basi oblique decurrens, superior dimidio brevior, erectus, cauli parallelus, reniformi-rotundatus, oblongus, convexus, appressus. Cellulæ irregulariter 6-angulato-quadratæ, inferiores medium versus elongatæ. **Perianthia nulla.**

Larger than any British species, the fronds or stems 3 or 4 in. long, simple or slightly branched, near ¼ in. wide, tufted, and from the dirty state of the bases appearing to have grown in muddy soil. The regular erect lesser-lobes give to it something of the appearance of *Chiloscyphus Billardieri*.

The description of *S. splendida* Spruce comes very near, and it may even be the same plant; if so, its being found in the Andes and in Jamaica remains still an interesting circumstance.

92. *Isotachys serrulata* Sw. *Jungermannia serrulata* Hook. Mus. Exot.—A few small tufts of this variable species, mixed with mosses.
93. *Lepidozia cupressina* Sw. *L. tumidula* Tayl. — Large tufts, exactly like others from Killarney.
94. *L. capillaris* (Sw.) Lind. — Mixed with *Microthamnium* and lichens.

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95. *Mastigobryum Jamaicense* L. & L.
96. *M. cuneistipulum* G. & L.
*97. *M. Vincentinum* L. & L.—St. Vincent.
98. *M. stoloniferum* Lindenb.
99. *Trichocolea tomentella*, *β. tomentosa* Syn. Hepat.
100. *Sendtnera adunca* Dicks. *S. juniperina* Nees. *Herberta adunca* Spruce.
101. *Radula pallens* Nees.
102. *R. complanata*, *β. propagulifera*, Syn. Hepat.—A scrap with mosses.
103. *Lejeunia Guilleminiana* (Nees & Mont.) Spruce. *Phragmicoma* Syn. Hepat. — A large loose blackish tuft, with stems 3 in. long; two perianths only.
104. *L. corticalis* L. & L. (*Phragmicoma*).—A few scraps only.
105. *L. brachiata* Nees.
106. *L. squamata* Nees,—On *Thuidium*, a few morsels.
*107. *L. Mougeotii* L. & G.—On leaf of *Calophyllum*. Guadaloupe.
108. *L. denticulata* (Web.) Nees.
*109. *L. contigua* Nees.—On a fern-frond. Brazil; Mexico.
*110. *L. phyllobola* Nees.—Cuba; Brazil.
111. *L. flava* Swartz.—A scrap with *Radula propagulifera*.
*112. *L. lucens* Tayl.—Andes; Ohio.
*113. *L. cornuta* Lindenb. — "In India occidentali," Swartz; perhaps Jamaica. Also Guiana and Madagascar.
114. *Frullania gibbosa* Nees.
115. *F. hians* Tayl.
116. *F. Brasiliensis* Raddi.—A very variable plant.
117. *Metzgeria dichotoma* (Sw.) Nees.
118. *Pseudaneura fucoides* Sw. *Jungermannia* Swartz; Hook. Mus. Exot. *Metzgeria* Nees, Synops. Hepat.

NOTES ON PONDWEEDS.

By Alfred Fryer.

3. Potamogeton lucens L.—Stem stout, branched from a little below the middle; *fruiting branches with many lateral branchlets starting at nearly right angles;* leaves *all submerged*, translucent, undulate and finely serrulate at the margins, elliptical to lanceolate or oblong-ovate to rotundate, subsessile petiolate; lamina narrowed into the petiole, but decurrent to the stem, not amplexicaul, acuminate, mucronate, or cuspidate; lowest often reduced to a thickened midrib: stipules 2-keeled, very large, long, obtuse, subscarious to herbaceous; peduncle stout, thickened upwards; spike dense, cylindrical; drupelets large, "turgid," obtuse on the back, faintly keeled; lateral ridges obscure; beak short, subcentral; colour of the whole plant yellowish olive-green, or green, rarely blue-green.

The largest British pondweed. All the branches ultimately rise and float near the surface, but remain actually submerged, even the uppermost leaves being covered by a thin film of water; at the time of flowering numerous lateral branches start at nearly right angles from the fertile stems and increase their buoyancy, so that the heavy flower-spikes are sustained above the surface of the water until fertilization has taken place. The leaves are extremely variable in size and shape, even upon the same branch; 2–14 in. long by $\frac{1}{2}$–$2\frac{1}{2}$ in. broad; the midrib is always excurrent, even in sub-orbicular *hooded* examples. The hooded tip to the leaf characteristic of *P. prælongus* also occurs in a less marked degree in some forms of *P. rufescens*, and very rarely in young plants of the present species, but in such cases the boat-shaped contraction does not occur in all the leaves. The lowest leaves on the stem are commonly reduced to a thickened, sometimes clavately rounded midrib. This is shortly stalked, showing that the species is truly petiolate, although the ordinary leaves are subsessile from the lamina being narrowly decurrent along the petiole until it reaches the stem. This character usually disappears in drying, and then many of the leaves appear distinctly stalked. These linear bladeless lower leaves are more freely produced on autumnal shoots newly sprung from the rootstock, some examples of which at first develop no others, and then bear a striking resemblance to the early state of *P. natans;* from which, however, they may be readily distinguished by the *short*, *channelled* petiole, that of *natans* being many inches long. The thick midrib, which represents the blade of the leaf, is flat; or, rarely in both species, swollen into a cylindrical, clavate mass, looking more like a portion of the stem than a transformed leaf. In these autumnal shoots many of the naturally formed leaves are narrow acuminate; this is the state usually, but erroneously, described as the *P. acuminatus* of Schumachucher, which, however, is a permanent form, retaining its distinctive peculiaries throughout.

Coriaceous floating leaves are rarely produced; they have been found in shallow-water forms, which at *present* we are unable to refer to any of the species separated from the old Linnean aggregate. When present, these leaves are not so distinctly coriaceous as those of some states of *P. Zizii;* they should be looked for after a continuance of hot weather, when the temperature of the water has been unusually raised; likely enough they may then be found on quite typical deep-water forms.

The stipules are very large and long, 2–4 in., slightly scarious at the tips; but the greater part of each is herbaceous, coloured like the rest of the plant, yellowish olive-green. Sometimes they are entirely herbaceous, green, with numerous longitudinal nerves, with cross-veins anastomosing towards the tip. Two of these nerves are very prominent, each mounted on a fold in the stipule and slightly winged, forming a conspicuous two-keeled back.

The peduncles are much stouter than the stems from which they spring, soon becoming subterminal from the increasing growth of the plant, much swollen towards the middle, and suddenly contracted beneath the flower-spikes. Usually from $2\frac{1}{2}$–$3\frac{1}{2}$ in. long,

but sometimes 14 in. or more. The spike is thick, cylindrical, densely fruited, of far more uniform length than the peduncle, seldom exceeding $2\frac{1}{2}$–3 in.

If care be taken in selecting mature fruit, it will be found that the drupelets do not alter much in drying; perhaps the keeled lateral ridges are usually a little more prominent in the dried state, but the reverse is certainly sometimes the case. Dr. Boswell, in his admirable account of *P. lucens* in the third edition of 'English Botany,' describes the drupelets as "nearly straight along the upper margin": this well describes the immature fruits, some of which are to be found in every spike, but those that are thoroughly ripened have the upper margin slightly convex, so the beak becomes subcentral. Probably the want of uniformity in published descriptions of the fruits of this genus is due to the specimens described being in different stages of maturity. Only extreme care when collecting fruiting specimens in the field, can yield trustworthy results; especially in the case of a species like the present, the drupelets of which attain their full size long before they are fully mature.

This is not the typical or central form of the *lucens* group aggregated by Chamisso and Schlectendal into one species, *P. Proteus*. The type will probably be found in the little-known *Zizii*-form called *P. coriaceus* by Nolte. Palæontologists may perhaps be able to tell us whether *P. lucens* has been found in as ancient beds as *heterophyllus* or *Zizii*, forms already traced to periods immediately preceding the glacial cold.

SYNOPSIS OF *TILLANDSIEÆ*.

By J. G. Baker, F.R.S., F.L.S.

One of the last things that Mr. Bentham said to me, when he was working out the *Bromeliaceæ* for the 'Genera Plantarum," was, "You ought to draw up a synopsis of *Tillandsia*, like those of *Echmea* and *Pitcairnia*, for they are in very great confusion." At the time he spoke I had no thought of doing this, as I considered that they were in the hands of Professor Morren. But now that Morren is dead a synopsis of the suborder is needed so frequently, both for herbarium and garden purposes, that I propose to attempt to bring together the very widely scattered material bearing on the subject. I shall adopt the genera as they stand in Bentham and Hooker's 'Genera Plantarum,' and under them enumerate and describe the species as fully as the material to which I have access will permit.

The *Tillandsieæ*, as a suborder of *Bromeliaceæ*, are clearly marked off by their entire leaves, and free coriaceous capsules splitting septicidally into three valves, filled with minute seeds, of which the funiculus splits up into innumerable fine flexuose threads. As this structure is peculiar to them, a single seed is quite enough to allocate a plant.

The following is a key to the genera:—

Petals united in a distinct tube.

1. Sodiroa.—Calyx with a long tube. Leaves spaced out.
2. Caraguata. — Calyx with a short tube. Leaves rosulate. Anthers free; filaments very short.
3. Schlumbergeria. — Calyx with a short tube. Leaves rosulate. Anthers free; filaments longer than the anthers.
4. Guzmannia. — Calyx with a short tube. Leaves rosulate. Anthers syngenesious; filaments very short.

Petals not united.

5. Catopsis. — Appendage of the seeds large and flattened. Funiculus short.
6. Tillandsia.—Appendage of seeds a small mucro. Funiculus long.

1. Sodiroa André.

Calyx gamophyllous; tube long, cylindrical; segments ovate, falcate in the expanded flower. *Corolla* gamophyllous, longer than the calyx; segments oblong. "*Stamens* inserted in the corolla-tube; anthers connate." *Ovary* free, ampullæform, 3-celled; style long; stigmas short. *Capsule* oblong-trigonous, coriaceous. *Seeds* numerous, narrow, erect, with a funiculus splitting up into fine threads. *Stems* long, sarmentose.—*Leaves* spaced out, linear. *Flowers* few, densely spicate, each subtended by a large bract. A very distinct genus, named by M. André in honour of Father Sodiro, whose name is familiar to the readers of the Journal through the numerous new ferns he has discovered in the Andes of Ecuador. It differs totally from all the other *Tillandsieæ* by its sarmentose habit, non-rosulate leaves and long calyx-tube.

1. **S. Pearcei,** n. sp.—Stems as thick as a goose-quill, 1–3 ft. long, pendent from the trunks of trees. Leaves spaced out, ascending, linear from a clasping dilated base, moderately firm in texture, glabrous, 6–8 in. long, $\frac{1}{6}$ in. broad low down. Peduncle a few inches long, with a few linear erect bract-leaves, Flowers 2–3 in a dense spike, erect; bracts red, oblong, acute, $1\frac{1}{2}$ in. long. Calyx red, $1\frac{3}{4}$–2 in. long; segments ovate, imbricated, $\frac{3}{4}$ in. long. Corolla about an inch longer than the calayx; segments $\frac{1}{6}$ in. broad. Stamens and pistil shorter than the corolla.

Hab. Andes of Ecuador; forests of Pastassa, alt. 5000–6000 ft., *Pearce* 416! Gathered about 1867.

2. S. caricifolia André in Bull. Bot. Soc. France xxiv. 167.—Stems elongated, $\frac{1}{6}$ in. diam. Leaves many, spaced out, ascending, narrow linear from a dilated base, very firm in texture, with involute edges, pale green, glabrous, the lower a foot long. Peduncle several inches long, bracteated by many erect reduced leaves, the uppermost lanceolate and scariose. Flowers about 4, erect, in a dense spike; bracts oblong, acute, red, 1–$1\frac{1}{4}$ in. long. Calyx $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, red; tube cylindrical; segments ovate, $\frac{1}{4}$ in. long. Corolla not seen, "yellow."

Hab. Colnmbia; Alto de Armada, 1° 15′ N. lat., alt. 4500 ft. *André*. Gathered in 1876. New Granada; prov. Antioquia; St. José, alt. 8000 ft. in forest shade, *Kalbreyer* 1501; Gathered in the year 1880.

3. S. GRAMINIFOLIA André in Bull. Soc. Bot. France, xxiv. 167. —Stems slender, elongated, the thickness of a quill. Leaves ascending, crowded, linear, from a clasping ovate base, the blade in the fully-developed ones 6–8 in. long, dwindling down gradually in those of the peduncle to less than an inch. Flowers 6–8 in a dense capitulum; bracts ovate or oblong, acute or cuspidate, ½ in. long. Calyx twice as long as the bract; tube cylindrical; segments ovate, falcate, ¼ in. long.

Hab. Columbia; Alto de Armada, alt. 4500 ft., *André* 3402. Gathered in 1876. I am indebted to the kindness of M. André for careful sketches of his two type-species.

2. CARAGUATA Lindl.

Sepals erect, imbricated, shortly connate at the base. *Corolla* gamopetalous; segments oblong, shorter than the tube. *Stamens* inserted at the throat of the corolla-tube; filaments very short. *Ovary* free, 3-celled; style long; stigmas linear, twisted. *Capsule* triginous, coriaceous, dehiscing septicidally. *Seeds* numerous, narrow, with a funiculus breaking up into fine threads.—Acaulescent, with leaves in a dense rosette. Inflorescence very various.

Section CARAGUATA PROPER.—Corolla longer than the calyx.

Inflorescence capitate . .	Sp. 1–3.
Inflorescence a simple spike .	Sp. 4–7.
Inflorescence a dense panicle .	Sp. 8–11.

Section MASSANGEA.—Corolla shorter than the calyx . Sp. 12.

1. C. LINGULATA Lindl. in Bot. Reg. sub t. 1068; Roem. et Schultes, Syst. Veg. vii. 2, 1230; Beer, Brom. 77; Morren, Fuchsia, t. 4; Kerner, Hort. Semper, t. 274; Griseb. Fl. Brit. W. Ind. 598. *C. latifolia* Beer, Brom. 78. *C. splendens* and *cardinalis* Hort. *Tillandsia lingulata* Lam. Encyc. i. 617; Jacq. Stirp. Amer. t. 62 (Plumier, Bot. Amer. tabs. 62, 73, 74; Sloane, Hist. Jam. t. 120).—Leaves 30–40 in a dense rosette, lanceolate, 1–1½ ft. long, 1¼–1½ in. broad at the middle, 2–3 in. at the ovate dilated base, thin in texture, almost without lepidote scales, usually striped vertically with red-brown down the back. Peduncle ½–1 ft. long; bracts imbricated, erect, lower green, upper bright red. Flowers in a dense globose capitulum, surrounded by numerous large ovate acute falcate bright red bracts 3–4 in. long; flower-bracts narrow, obtuse, coriaceous, 1½–2 in. long; pedicels short. Calyx under an inch long; segments lanceolate, not imbricated. Corolla yellowish white, 1½–2 in. long; segments short, oblong, obtuse. Stamens shorter than the corolla-segments.

Hab. West Indies, Guiana, Columbia, and Ecuador. Three forms are figured by Plumier, Beer's *C. latifolia* being founded on Plumier's tab. 94. *C. splendens* Bouché, figured Flore des Serres,

t. 1091, and Otto Gartenzeitung, 1856, t. 4, and *C. cardinalis*, figured Illust. Hort. 1880, t. 674, and Rev. Hort. 1883, 12, are fine showy garden forms, with larger more brightly coloured bracts than the type.

2. C. SANGUINEA André in Rev. Hort. 1883, 468, with figure; Baker in Bot. Mag. t. 6765. *Tillandsia sanguinea* André, Tour, 367. Leaves 20–30 in a dense rosette, lanceolate, the outer a foot long, 1½–2 in. broad at the middle, acute, thin in texture, but little dilated at the clasping base, obscurely lepidote on both surfaces, the base green, the upper half or two-thirds strongly tinged with bright red. Flowers in a sessile central capitulum, each with a short pedicel, and subtended by an oblong obtuse membranous bract. Calyx ⅝–¾ in. long; segments oblong, obtuse. Corolla 2½–3 in. long, yellowish white; tube very slender, dilated at the apex; segments small, oblong, obtuse. Stamens reaching half-way up the corolla-segments; filaments very short; anthers lanceolate.

Hab. Western Andes of New Granada, between Tuquerres and Barbacoes. Discovered by M. André in 1866, and introduced into cultivation. My description was made from a plant that flowered at Kew in November, 1883.

(To be continued.)

SHORT NOTES.

CODIUM BURSA AT BRIGHTON. — Some fine specimens of this rare and curious sea-weed have been thrown up by the sea at Brighton during the recent gales. One which I found near the old Chain Pier in the second week in December was nearly twelve inches in diameter, another about eight. I have not been able to detect any signs of fructification in the specimen I have examined, except that in most of the threads of which the singular pouch-shaped frond is composed the endochrome shows a decided tendency to become condensed at the top into one or more globular masses, which look as if they might develop into zoospores.—F. I. WARNER.

NEW WILTS RECORDS.—I send you specimens of *Sium latifolium* from the canal near Swindon, and of *Nasturtium sylvestre*, *Diplotaxis muralis*, and *Hypochæris radicata* from Chippenham, which I believe have not been qefore recorded for Wilts.—W. A. CLARKE.

OROBANCHE PICRIDIS IN SURREY.— In June last I found, between Witley and Hambledon, Surrey, in a large piece of waste sandy ground, an *Orobanche* which on examination I took to be *O. Picridis*. The name has since been confirmed by Messrs. W. H. Beeby, Arthur Bennett, and others. This plant has twice before been recorded for the county; but in one case (*fide* Mr. Arthur Bennett) it was only *O. minor*, and there seems to be some doubt as to the other. I noticed the withered plants of 1885 last spring, and it was in abundance this season. The "host plants" were *Crepis virens*, *Leontodon hispidum*, and, in two cases, *Nepeta Glechoma*. It entirely avoided leguminous plants, which abound at the spot,

and this fact is strongly in favour of its claim to more than sub-specific rank. I also found late in September a very curious *Filago*, which differs from both typical *F. germanica* and *F. spathulata*, in a field near Witley (District 2 *a*), flowering on into November. I have since noticed apparently the same form in a field east of Hambledon Church, and suspect that it will prove to be frequent on the Lower Greensand in District 2 *a*. Mr. Beeby inclines to think it a varietal form of *F. germanica*, but it is still *sub judice*.—Edward S. Marshall.

Silene Otites Sm. in Essex.—In Journ. Bot. 1880, p, 344, Mr. R. A. Pryor reported his discovery of this species on the Roman wall at Colchester, "in a somewhat exposed situation to the north of the town, by the footpath to the river." This was the first notice of its occurrence in Essex. On September 15th, 1886, I found several specimens of the plants growing on the top of the walls of Colchester Castle. This locality is about half a mile distant from Mr. Pryor's, and the ruins of the Roman wall do not extend far from his point in the direction of the Castle. The Castle may therefore, I think, be accounted a wholly independent station—though of course the same causes, natural or otherwise, which occasioned the appearance of the species in the one spot will also account for it in the other. The plants were six or eight in number, dwarfed as to height (4 to 6 in.), each plant much tufted, with the perennial stock thick and almost woody—very different in appearance from tall (18 to 21 in.) and graceful specimens kindly given me by Mr. Herbert Goss, F.L.S., and gathered by him on roadsides at Tuddenham St. Mary, Suffolk. My "find" throws no light on the inquiry whether or not *Silene Otites* is native to Essex. It is an interesting question whether at Colchester the plant extends along the whole of the remains of the Roman wall, and to the other ruins in that old town; also, further, whether it is to be found in less apparently artificial situations than upon ancient walls. On these points I have not yet succeeded in obtaining information, but I hope to be more fortunate during the present year.—William Whitwell.

[Mr. J. C. Shenstone ('Essex Naturalist,' p. 24) says that the plant "was introduced [in its Colchester habitats] by local lepidopterists, as food for their caterpillars."—Ed. Journ. Bot.]

Webera cucullata Schwgr. in Britain.—Among a number of mosses from a collection which I made in the West Highlands of Scotland in the summsr of 1883, was one which through the kindness of Mr. E. M. Holmes was submitted to Mr. Mitten, and which he referred to the above species. This plant, though not uncommon on the various mountain ranges of central and northern Europe, has not hitherto been found in these islands. It was growing in the barren state in a crevice of the rock near the summit of Ben Attow, Ross-shire (alt. 3500—4000 ft.), in company with *Dicranum elongatum* Schwgr., with which it was so closely intermingled as to make it very difficult to separate the one from the other. As the species has not been described in any

British work on mosses, it may be useful to quote the following description from Schimper (Synops. 2nd ed. p. 397 :—"Dense cæspitosa. Caulis e basi plerumque decumbente erectus, simplex vel parce ramosus. Folia inferiora et ramulorum subimbricata, ovata, concava, mutica, integra, superiora longiora, angustata, apice serrata et haud raro cucullato-incurva, omnia mollia, subopaca. Capsula pendula, crassiuscula, cum collo abbreviato-piriformis. sicca vacua sub ore haud coarctata, mollis, badia, ætate atro-brunnea. Operculum minus, mamillare. Peristomii dentes angustiores, breviores, luteoli, interni tenerrimi pallidi processus perangusti ciliaque brevia fugacia. Bryol. eur. vol. iv. tab. 343." . . . . "Differt a *Web. nutante* var. *uliginosa* foliis latioribus mollibus vix nitentibus, capsula crassiore microstoma, peristomio minore, interno minus perfecto."—H. N. Dixon.

Agropyrum (Triticum) violaceum Hornemann in Scotland.—On 30th July, 1878, I gathered on a ledge of rock, about 900 or 1000 ft. below the summit of Ben Lawers, Perthshire, two specimens of a *Triticum* which for some time lay unnoticed in my herbarium. When, however, Dr. Buchanan White informed me he was collecting materials for the Flora of Perthshire, I went through the whole of my collection to supply him with localities, and in due time arrived at this grass, of which I forwarded him one of the two specimens. At the same time I searched though the Tritica of my European herbarium, and found this grass to correspond exactly in every minutest particular with specimens of *Triticum violaceum* Hornemann I had obtained from "Dovre, Kingswold, Norvegia, coll. Dr. N. C. Kindberg, 1883," and others "ex montosis ad Alten, Lapponia occidentalis, leg. Reutermann." In the meantime Dr. White communicated with Mr. Arthur Bennett, and I also, last June, examined all the specimens in the British Museum Herbarium, including Don's somewhat meagre specimen of his *Triticum alpinum*. Mr. Bennett, last month, visited Kew on the same errand, and I have just received a letter from him, in which he states that "having carefully compared the Ben Lawers *Triticum* with *violaceum*, I could come to no other conclusion than that it belongs to that species, and it is certainly identical with an original specimen of Don's *T. alpinum* in the Kew Herbarium." Unfortunately, only a small piece of root was gathered with one of the specimens, but this, on a careful examination, would show that the plant was fibro-cæspitose, not creeping; and therefore, assuming this to be Don's original species, Sir. J. D. Hooker's theory that *T. alpinum* is only a form of *repens* must fall to the ground. Indeed, it is nearer *caninum* than *repens*; but to my mind, a true and very distinct species from any other: one of the chief characteristics by which it can in nearly every instance be told at a glance is the purple tinge of the spikelets, hence, doubtless, its trivial name. I suppose this grass to be also the *T. biflorum* Mitten, but have not seen authentically named specimens. Nyman, Conspectus Flor. Europæ, p. 841, places *T. violaceum* between *repens* and *caninum*, giving as localities, "Lapponia occidentalis, Suecia borealis, Norvegia alp. = ? *T. alpinum* (Don)

Scot." I think this surmise may be said now to be amply confirmed. For obvious reasons I have not dilated upon the exact locality on or near Ben Lawers where this grass was found, but I may say I have a very fair recollection of the circumstances under which I found it, and as I hope to be in Scotland this summer I shall renew my search for this very interesting rediscovery of another of Don's lost species. I cannot find this grass recorded for the New World, but I have come across a specimen in my herbarium, from Denver, Colorado, which is so named (leg. Marcus E. Jones, 1879, No. 1579); this, however, is a totally different species.—J. Cosmo Melvill.

NOTICES OF BOOKS.

Hymenomycetes Britannici; British Fungi (Hymenomycetes). By the Rev. John Stevenson. Vol. ii. Blackwood & Sons. 8vo, pp. 363. 63 cuts.

This is the second volume of an excellent work, the first of which we recently noticed in these pages (1886, p. 186). Although it appeared rather late in what may be called the fungus season of last year, an opportunity was afforded of testing it in actual practice, and, so far as our experience extended, we found it a valuable help. We can now more accurately determine the progress made in the eleven years since the appearance of Cooke's 'Handbook' in our knowledge of British species. The genera in this volume being too numerous, we take the orders for comparison, which give the following result:—

	Cooke.	Stevenson.
Agaricini (Cortinarius to Lenzites) .	211	362
Polyporei	144	202
Hydnei	45	77
Thelephorei	70	107
Clavariei	57	71
Tremellinei	32	33
Totals	559	852

Adding this increase of 293 to 337 of the first volume, we have a total of 630 species—no inconsiderable advance in our insular flora. Following Fries' 'Hymenomycetes Europæi,' the genus *Lepista* Fr. is dropped, the species being relegated to *Agaricus*; also *Hymenochæte* Lév. and *Ditiola* Fr. do not appear. *Apyrenium* Fr. and *Hymenula* Fr., retained by Fries, are omitted, and Berkeley's new genus *Laccaria* is not adopted. Some genera not hitherto found in our English books appear, viz., *Cladoderris* Pers., a genus of *Thelephorei*, represented by one species; *Pterula* Fr., a genus of *Clavariei*, by two species; and *Guepinia* Fr. by one species. In the Addenda the genus *Hiatula* Mont. with one species; and *Acetabularia* Berk., a subgenus of *Agaricus* lately formed to receive *Agaricus*

acetabulosus Sow., are recognised. Placing *Solenia* Hoffm. in the order *Polyporei*, instead of associating it with *Cyphella* in the order *Thelephorei*, will not remain unchallenged.

We could have desired to see in the lower species of this volume a larger contribution to our knowledge of the form and size of spores than it has been in the power of the author to give. Now that every mycologist possesses a microscope, it may be hoped that no opportunity may be lost of observing and recording the character of the spores, which can be best done in fresh specimens, and thus enable the author to correct a future edition of his work with this much-needed information.

The woodcuts are of the same excellent quality as in the first volume, and a short but useful glossary is given. We again repeat our commendation of this most useful work to all who wish to acquaint themselves with our British *Hymenomycetes*, a study fraught with much interest, and not a little utility.

W. Phillips.

British Submarine Vaucheriæ.

Professor Nordstedt, of Lund, has published some remarks on those little-understood plants, the British Submarine *Vaucheriæ*. These remarks form a sort of appendix to such parts of Mr. E. M. Holmes's paper on "British Marine Algæ" (which appeared in the 'Scottish Naturalist' in April, 1886) as relate to the British submarine species of *Vaucheriæ*. The Professor refers first to the *V. velutina* of Harvey (Phyc. Brit.), of which he says it is impossible to determine the species. The specimen labelled *V. velutina* (leg. Capt. Carmichael) in the Kew Herbarium is, Dr. Nordstedt says, *V. sphærospora*; those named *V. velutina* in the Agardhian Herbarium belong to *V. Thuretii*, which often grows mixed with *V. sphærospora*. The specimen marked *V. piloboloides*, in Mr. Holmes's 'Algæ Britannicæ rariores exsiccatæ,' No. 50, from Weymouth, is *V. sphærospora*, and not *V. piloboloides*.

The difficulty of distinguishing these plants is enhanced by the fact of the species frequently growing mixed together. Dr. Nordstedt has, however, observed some differences in their habitat. Thus *V. dichotoma* and *V. litorea* are to be found at the lowest tide-marks; *V. sphærospora*, *V. Thuretii*, *V. intermedia*, and *V. coronata* at half-tide level; while *V. synandra* grows on the highest ground, sometimes among grass. *V. sphærospora* is met with on the shore of the Thames at Kew, and in the river at Malden, in Essex. This plant spreads its filaments over sand, or grows in dense masses in mud, while *V. piloboloides*, according to Woronin (Bot. Zeit. No. 27), grows in deeper water than any of the other species, probably in quite salt water.

V. ornicephala is an older name than *V. sericea* Lyng., but it is not certain whether this is the same species as *V. sericea*.

Dr. Nordstedt's remarks are written in English, and are accompanied with figures of *V. litorea*, *V. sphærospora*, *V. Thuretii*, and *V. synandra*, and descriptions of each of these species.

Professors Wittrock and Nordstedt continue to issue their speci-

mens of *Algæ aquæ dulcis exsiccatæ*. Nos. 15, 16, and 17, each containing about fifty species, have recently appeared. Descriptions are, as in the preceding numbers, given of the new species.—M. P. M.

The members of the Essex Field Club have determined to issue their 'Transactions' and 'Proceedings' in the form of a monthly journal, entitled 'The Essex Naturalist,' the first number of which is before us. It will be obtainable by non-members, "at a price not exceeding sixpence per sheet of sixteen pages." The concluding part of the 'Transactions' contains an interesting sketch by Mr. Boulger, entitled "The Life and Work of John Ray, and their relation to the Progress of Science."

The 'Flora Brasiliensis' continues to make steady progress: the last parts issued contain the *Tiliaceæ* and *Bombaceæ*, elaborated by Dr. C. Schumann, and the continuation of the *Melastomaceæ*, by Dr. Cogniaux.

New Books.—W. R. Dudley, 'The Cayuga Flora: pt. i.' (8vo, pp. xxx. 133, v.: 2 maps: Ithaca, N. Y.: Andrus & Church). — A. Mascleff, 'Plantes Vasculaires du Département du Pas-de-Calais' (8vo, pp. lii. 215: Paris, Savy). — F. A. Zürn, 'Die Schmarotzer, teil ii. Die pflanzlichen Parasiten' (8vo, pp. xvi. 243, tt. 2). — J. Cuboni & V. Mancini, 'Synopsis Mycologiæ Venetæ secundum matrices' (8vo, pp. viii. 361).—B. Högrell, 'Botanikens Historia' (8vo, pp. 304: Göteborg, Bolinder). — 'Flora of Leicestershire': issued by the Leicester Literary and Philosophical Society (London, Williams & Norgate: 8vo, pp. xxvi. 373). — K. Goebel, 'Outlines of Classification and Special Morphology of Plants' (translated by H. E. F. Garnsey, revised by I. B. Balfour), (Oxford, Clarendon Press: pp. xii. 515: 407 cuts).

Articles in Journals.

Bot. Centralblatt. (No. 1). — H. Steininger, 'Beschreibung der europäischen Arten des Genus *Pedicularis*' (contd.). — F. Thomas, *Synchitrium cupulatum*, n. sp. — (No. 2). F. Benecke, 'Ueber den Knöllchen an den Leguminosen-Wurzeln.'

Bot. Jährbucher (Dec. 31).—R. A. Philippi, 'Ueber die Chilenischen Arten des Genus *Polyachyrus*' (11 new species; 1 plate).—F. Stephani, 'Hepaticæ africanæ.'—Id., 'Hepaticæ von der Halbinsel Alaska' (1 plate). — E. Edelhoff, 'Vergleichende Anatomie des Blattes der Familie der Olacineen.' — —. Gürich, 'Die botanischen Ergebenisse der Flegel' schen Expedition nach dem Niger-Benue.'—H. T. Geyler, 'Notiz über eine Pliocänflora von Frankfort.'

Bot. Zeitung (Dec. 24, 31). — F. von Tavel, 'Beiträge zur Entwickelungsgeschichte der Pyrenomyceten. — (Jan. 7, 14). F. Hildebrand, 'Experimente über die geschlechtliche Fortpflanzungsweise der Oxalisarten.' — (Jan. 7). H. Christ, 'Abnorme Bildungen bei *Geranium Robertianum*' (1 plate). — (Jan. 14). H. Hoffmann, 'Culturversuche über Variation.'

Bull. Soc. Bot. France (Jan. 10), (xxxiii.: Sess. extraordinaire à Milla). — B. Montin, 'Sur les Pulmonaires de la flore du Gard.'

—Durand et Flahault, 'Les limites de la région mediterranéene en France' (with map).—J. Ivolas, 'Les plantes calcicoles et calcifuges de l'Aveyron.' — B. Martin, 'Sur un hybride du genre *Euphorbia* (*E. Characias* × *amygdaloides*).—L. Chevalier, 'Note sur le *Centaurea silvatica* de Pourret.' — F. Guy, 'Sur la formation des Kystes chez la Chlorosporées.'— P. Viala et L. Ravaz, 'Nouvelles espèces de *Phoma* se developpeent sur les fruits de la Vigne' (*P. flaccida*, *P. reniformis*, spp. nn.).—Rapports sur les excursions de la Société.

Bull. Torrey Bot. Club (Jan.).—J. S. Newberry, 'The ancestors of the Tulip-tree' (2 plates). — G. Vasey, 'New Mexican Grasses' (*Sporobolus Shepherdi*, *S. annuus*, *S. racemosus*, spp. nn.).

Essex Naturalist (Jan.). — J. Clarke, 'Notes on the Saffron Plant.'—J. C. Shenstone, 'Colchester Plants.'

Flora (Jan. 1, 11). — G. Worgitzky, 'Vergleichende Anatomie der Ranken' (1 plate).

Gardeners' Chronicle (Jan. 1).—*Æchmea flexuosa* Baker, n. sp.—(Jan. 8). *Catasetum costatum* Rchb. f., n. sp.—(Jan. 15). *Angræcum aricularium* Rchb. f., n. sp. — T. Moore, *Adiantum hians*, n. sp.— M. T. Masters, 'A new bi-generic hybrid (*Phajus* × *Calanthe*).'— *Tapeinanthus humilis* (fig. 13). — (Jan. 22). *Alocasia eminens* N. E. Br., n. sp. — (Jan. 29). *Masdevallia pusiola* Rchb. f., *Oxalis catharinensis* N. E. Br., *Tillandsia reticulata* Baker, spp. nn.

Magyar Norent. Lapok. (Nov., Dec.). — J. Csató, '*Juniperus Kanitzii* (*J. Sabina* × *communis*).' — V. Janka, 'Adnotationes Botanicæ.'—L. Simonkai, 'A Bucsecsen gyujtött növényekröl.'

Nuov. Giorn. Bot. Ital. (Jan.). — A. Piccone, 'Ulteriori osservazioni intorno ugli animali ficofagi ed alla disseminazione delle alghe.' — F. Tassi, 'Dell' anestesia e dell' avvelenamento nei vegetali.'—L. Nicotra, 'Elementi statistici della flora siciliana.'

Oesterr. Bot. Zeitschrift (Jan.).—'Ferdinand Hauck' (portrait). —F. Krasan, 'Ursachen der Haarbildung.' — J. Ullepitsch, '*Anemone Scherfelii* n. sp.'— A. Hausgirg, 'Bergalgenflora Böhmens.'— B. Blocki, 'Zur Flora von Ostgalizien.' — E. Formánek, 'Flora der Karpathen' (contd.).—P. G. Strobl, 'Flora des Etna' (contd.). —B. Stein, 'Rudolf von Uechtritz' (Dec. 31, 1838–Nov. 21, 1886).

LINNEAN SOCIETY OF LONDON.

Dec. 16*th*, 1886.—William Carruthers, F.R.S., President, in the chair. — H.R.H. The Prince of Wales was elected an Honorary Member of the Society; and the following gentlemen were elected Fellows:—Mr. Arthur W. Bawtree, Mr. Frederick Justen, Mr. Frailokya N. Mukharji (of Calcutta), Mr. Francis W. Oliver, and Mr. Richard V. Sherring; afterwards Mr. George Nicholson was elected an Associate of the Society. — The President announced that Sir George MacLeay, K.C.M.G., F.L.S., had presented to the Society a framed water-colour portrait of the Rev. William Kirby, F.L.S., the distinguished entomologist, and the MSS. and Correspondence of his father, Alexander MacLeay, F.L.S., elected 1796,

formerly Secretary to the Society. For these donations a special vote of thanks was unanimously accorded by the Fellows present.—Prof. Bower exhibited and made comments on a number of large photographs, taken in Ceylon, and chiefly representing the vegetation of the Island and Botanic Garden of Peradeniya. Among the plants were *Ficus religiosa*, said to be 2000 years old; *F. Trimeni*, *F. elastica*, the Banyan-tree at Nequimbo; Travellers' Palm, *Ravenala madagascariensis;* the avenue of *Oreodoxa regia* at Peradeniya; Jack-fruit, *Arctocarpus integrifolia;* Great Bamboos, *Dendrocalamus giganteus*, *Alsophila crinita*, *Corypha umbraculifera*, *Caryota urens*, *Lodoicea seychellarum*, &c. — Mr. D. Morris exhibited leaves and fibre of two species of *Agave*, viz., *A. Ixtli* and *A. Salmdyc* The former has been traced as one of the plants yielding the "Sisal Hemp" of commerce. The fibre prepared from these two plants was shown, and the merits of each dwelt upon at some length. The fibre of *A. Salmdyckii* possesses a peculiar curl which renders it practically unfit for commercial purposes; hence attempts to utilise the fibre of this plant, which is very common in the West Indies, has hitherto proved fruitless. The fibre of *A. Ixtli*, on the contrary, consists of glossy strong threads, which among other things are admirably adapted for rope-making. In proof of this the export of Sisal Hemp from Yucatan is stated to reach as much as £500,000 annually.—Mr. W. T. Dyer showed a Japanese volume on Botany, one of a set of the Honzo zufu (Illustrations and Brief Descriptions of the Plants of Japan), by Iwasatti Tsanemasa, which consists of ninety-six volumes, containing some 2000 coloured figures. Mr. Dyer read an interesting account of Japanese botanical works, sent by Mr. F. Dickins, F.L.S., which we hope to publish *in extenso*. — The President exhibited and made remarks on a spike of maize obtained from an ancient grave at Ancon, Peru, and on samples of prehistoric wheat from ancient British and Romano-British burial mounds near Salisbury and Winklebury, Wilts, along with wheat, for comparison, from Dunstable Market, mounted by Mr. Worthington G. Smith, F.L.S. — Mr. Charles T. Druery gave a communication on a new instance of apospory in *Polystichum angulare* var. *pulcherrimum* Wills. From his observations he infers that the formation of the prothallus is preceded by a very different series of phenomena from those already recorded. For the one case the prothalli are simple extensions of the cellular substance of the tips of the pinnules commencing at points quite beyond the venation, and produce no root-hairs unless brought into contact with the soil. In the other case, however, the prothallus is a direct outgrowth of the tip of a veinlet protruded through the upper surface of the pinnule, and at once produces root-hairs in abundance, long before it assumes any other characteristic of a prothallus; and finally the resulting prothallus is much thicker in substance. Whether archegonia or antheridia are present upon the solitary specimen in question under examination cannot be positively asserted. — A paper was read on apospory and allied phenomena by Prof. F. O. Bower. Adopting for the purposes of this investigation Sach's definition of the "spore" as in-

cluding the spores of the ferns and mosses and their homologues, the term "sporal arrest" is applied to all cases where such spores do not come to functional maturity, The arrest is often, but not always, followed by substitutionary or correlative vegetative growths. These take the form of buds similar to the sporophyte which produced them, and then would be termed cases of "sporophytic budding"; but in other cases the correlative growths may assume the characters of the oophyte or prothallus. Where this happens the phenomenon is termed "apospory." This direct transition from the sporophyte to the oophyte has been *induced* some ten years ago in certain mosses by Pringsheim and Stahl; and it is now described in detail in two ferns, an *Athyrium* and a *Polystichum*: both plants were found some years ago growing wild, and the fact of the transition was recognised by Mr. Druery and Mr. Wollaston, and has been already reported to the Linnean Society. The present paper describes these and similar phenomena in detail, and shows how in the *Polystichum* at least four different modes of origin of the oophytes may be distinguished, two being in connection with the sorus, while two are at points apart from the sorus, and may even occur on fronds which bear no sori at all. The latter part of the paper is occupied by comparing these phenomena with others already known in higher and lower plants. The general conclusion drawn from this comparison and from the facts themselves is that the whole phenomenon of apospory is to be regarded rather as a sport than as a reversion bearing deep morphological conclusions with it.

OBITUARY.

By the death of Thomas Moore, which took place suddenly at his house at the Chelsea Botanic Garden on New Year's Day, gardening botany has sustained a great loss. He was a self-made man, and had worked his way to such a knowledge of the great mass of garden plants and florists flowers' as probably no one living possesses in anything like the same combination. He was born at Guildford on May 21st, 1821, and was acting as assistant to Mr. Marnock in laying out the botanic garden in the Regent's Park, when, in 1848, on the retirement of the Chinese traveller, Fortune, he was selected, on the recommendation of Dr. Lindley, to fill the post of curator to the old garden of the Apothecaries' Company at Chelsea, made famous by Philip Miller. To this post he was regularly re-elected annually for thirty-seven years, and its duties were so light as to leave him ample leisure for writing and other engagements. He was connected with the 'Gardeners' Chronicle' from its first establishment in 1841 down to 1881, first as assistant to Dr. Lindley, and from 1866 as co-editor with Dr. Masters. He acted also as editor of the 'Gardeners' Magazine,' the 'Floral Magazine,' the 'Florist and Pomologist,' and the 'Orchid Album' of Messrs. Warner and Williams. In the preparation of the well-known 'Treasury of Botany' and of the 'Epitome of Gardening' (the latter an expansion of an article on gardening which he wrote

conjointly with Dr. Masters for the 'Encyclopædia Britannica') he took a principal part; and he also edited the last edition of Thompson's 'Gardeners' Assistant.' In botany pure and simple, ferns were his speciality. For a generation he named nearly all the new ferns that have been brought into cultivation, and described the novelties. In the three volumes of his 'Index Filicum' (1857—1862), he worked out a classification modified from those proposed by Presl and John Smith, described and figured all the genera, and enumerated all the known species, with their synonyms and localities, as far down as the letter G, when the work unfortunately came to a stop through Mr. Pamplin's retirement from business, and was never resumed. Under the editorial supervision of Dr. Lindley he published, in 1856, his magnificent folio work on the British Ferns and ther varieties, illustrated by nature-printing, fifty-one plates. He published also a 'Handbook' and a 'Popular History of British Ferns,' which have gone through several editions. He knew far more than anyone else about their innumerable sports, many of which are named and described in his work. Latterly he paid special attention to the garden forms of *Adiantum*. His large general collection of ferns has been bought for Kew. At the London flower-shows and meetings of the committees of the horticultural societies he was one of the most regular attenders for the last thirty years. At the Royal Horticultural Society he acted for a long time as floral director and secretary of the floral committee. He was one of the principal secretaries to the International Floral Exhibition in 1866. As a judge at flower-shows his services were in great request; and of all the smaller gardening societies, such as the Pelargonium Society, the Carnation Society, the Auricula Society, and the Dahlia Society, he was one of the most active members. Almost the last work of any account which he did was in connection with the Daffodil Congress; with the help of Mr. Peter Barr he defined the garden forms and monsters of *Narcissus*, and classified them in their proper relation to the types acknowledged by botanists. He was singled out by universal consent as the one man who was able to do this, and in the hoped-for reconstruction of the Royal Horticultural Society it will be most difficult to fill the place which he has occupied for a whole generation so diligently and so unostentatiously.

Another gap has been made in the ranks of our veteran workers by the death of George William Johnson, which took place on Friday, Oct. 29th, at his residence, Waldronhurst, Croydon. Although not strictly a botanist, Mr. Johnson has for very many years been associated with botanical and horticultural literature, and his 'History of Gardening,' published in 1829, remains a standard work of reference on matters connected with botanical biography and bibliography. A very full and interesting account of Mr. Johnson, with portrait, appears in the 'Journal of Horticulture' for Nov. 4th; and as this is readily accessible, we do not propose to give a detailed notice of his life. Mr. Johnson was born at Blackheath, Kent, on Nov. 5th, 1802; and in 1848 established 'The Cottage Gardener' (now 'The Journal of Horticulture'), from the management of which he retired in 1881.

EQUISETUM LITORALE AS A BRITISH PLANT.

By W. H. Beeby.

(Tab. 273).

Equisetum litorale Kühlewein. — Barren and fertile stems alike, 6–18 in. high, rough, especially above; with or quite without branches, commonly with 10–12 ("6–16," Milde) furrows in well-grown stems. Central hollow of stem large, less in proportion to the diameter of the stem than in *E. limosum*, but markedly larger than in *E. palustre*. Lowest sheaths close or slightly open, becoming gradually more open upwards; the uppermost, especially in the fertile stem, funnel-shaped; lower brownish, with lanceolate-acute teeth, which are black, except at their base, and have a narrow scarious margin; uppermost paler than the stem, yellowish or yellowish green, their teeth darker, with black tips. Catkin usually yellowish, on a more or less elongated slender peduncle.

"*Sporæ abortivæ*, sporangia fibris spiralibus destituta, *elateres nulli*."—Milde.

The above description is drawn up from a series of Surrey specimens, and compared with that of Dr. Julius Milde in his 'Monographia Equisetorum.' In the Surrey plant the stems are decumbent below, and more or less arcuate throughout; but forms occur (var. *elatius* Milde) in which the stem is erect, and reaches a much greater height; there is also a dwarf form. The Surrey plant appears to pass gradually from the var. *gracile* to the var. *vulgare* Milde, but I have not seen a series of the varieties. Some of the examples accord very well with specimens of the var. *gracile* in Herb. Kew. In Continental and Canadian specimens the peduncle is often much more elongated than in any British specimens that I have yet seen. The position of *E. litorale* seems to be between *E. palustre* and *E. limosum*, and it is so placed by Nyman ('Conspectus,' p. 859). It is best distinguished from *E. palustre* by the much larger central hollow of the stem, and by the more numerous and shallower furrows; from *E. limosum* by the smaller hollow, by the furrows being fewer and rather deeper, by its paler colour, and conspicuously by the funnel-shaped uppermost sheaths.

The most noteworthy features about this plant are the abortive spores and the absence of elaters. Hence Dr. Milde calls it "one of the most remarkable of Cryptogams." By several authors it has been considered to be a hybrid between *E. arvense* and *E. limosum*, but Dr. Milde concludes by saying ('Die Höheren Sporenpflanzen,' p. 114) that, considering the wide range of the plant, this supposition seems doubtful. "Hybrid Cryptogams, in other cases, always appear singly, and as extraordinary rarities. The spores and sporangia are aborted in all the stations; nevertheless solitary green normal spores may always be found. At all events

I think the life-history of the plant is not yet complete. Duval-Jouve considers it a good species—not a hybrid."—Milde, *l. c.*

I had hoped to obtain last summer a supply of good fruiting examples, and to place them in proper hands for examination; but unfortunately, although the plant was found in great profusion in the locality whence I first recorded it (Journ. Bot. 1886, p. 54), most of the plants were last year sterile, and it was with difficulty that specimens were obtained sufficient to furnish the plate.

The following is the distribution as given in Nyman's 'Conspectus,' p. 859:—N. Germany; Denmark; Upland; Ingria; Liffland; Silesia; Bohemia, rare; Bavaria, rare; Austria (Vienna); Hungary, rare; and France. Milde also records it from North America, whence I have seen specimens from the shores of Lake Champlain (leg. T. Morong, Hb. Ar. Bennett).

The principal synonyms given by Milde (Monog. Equisetorum, p. 357) are—

Equisetum litorale Kühlewein ap. Ruprecht, Beiträge zur Pflanzenkunde des russ. Reiches. iv. p. 91 (1845).

E. inundatum Lasch ap. Rabenhorst, Bot. Centralblatt, 2, p. 25 (1846).

E. arvense c. *inundatum* Rabenhorst, Crypt. Fl. von Deutschland, ii. p. 333 (1848).

E. Kochianum G. Böckel, Aufzählung und Beschreib. aller in Oldenburg, etc., crypt. Gen. p. 30 (1853).

E. arvensi-limosum Lasch. Bot. Zeitung, p. 505 (1857).

E. arvense β. *campestre* Opiz, and *E. arvense* f. *serotina* Celakovsky in Lotos, p. 226 (1862).

E. maritimum Celak. *l. c. sup.* p. 229 (1862).

E. arvense × *Heleocharis* P. Ascherson in Fl. der Prov. Brandenburg, p. 901 (1864).

Description of Plate 273.—1. *Equisetum litorale*, from a Surrey specimen. 2. Transverse section of stem of same. 3. Ditto of *E. limosum*. 4. Ditto of *E. palustre*. (2, 3, and 4 reduced from the enlarged sections figured in Milde's 'Monog. Equis.,' Plates XIII., XV., and XVII.).

THE NEW 'INDEX OF PLANT-NAMES.'

By B. Daydon Jackson, Sec. L.S.

The close of the fifth year's work on the new Index of Phanerogams seems a fit opportunity of stating the present condition and prospects of the undertaking, together with a short history of its career. This will serve to answer many enquiries as to its progress, and probably to inform many unspoken speculations regarding it.

Our aim has been to construct a list of genera and species upon the 'Genera Plantarum' of Mr. Bentham and Sir Joseph Hooker,

that work being our authority as to circumscription of genera, and on all questions thereon, subject naturally to fresh information on points which were doubtful when the text of the 'Genera' was drawn up. This of course does not exclude our making full use of material which was not accessible in that work.

A beginning was made by transcribing the whole of the genera and their synonyms upon appropriately ruled foolscap paper, each retained genus being followed by its included genera, these latter being also written on separate sheets, referring to the genus retained. These sheets being sorted alphabetically, made a somewhat unwieldy index to the genera. The next operation was to follow up the heading with the species belonging or ascribed by various authors to each genus; the foundation for this was the interleaved copy of 'Steudel's Nomenclator,' in use at Kew, which contains an exceedingly large number of MS. additions, and is constantly increased by the accessions to the herbarium being entered therein, when specimens are incorporated. Sufficient room was left between the names for intercalation in the future, and each genus was enclosed in a stout cover, inscribed on the outside, and placed in strong boxes with a falling front, resembling the arrangement of genera in the herbarium. Rather more than 30,000 covers were required for the genera, and the whole of the MS. is accommodated in 178 boxes as described, housed in two sets of pigeon-holes; the entire MS. is computed to weigh rather more than a ton.

These preliminaries consumed eighteen months, with the help of two to four assistants. From this point various works were used for the insertion of references, beginning with DeCandolle's 'Prodromus' and 'Monographia,' Kunth's 'Enumeratio,' Walpers' 'Repertorium' and the 'Annales,' which gave a good foundation. Next, floras of large extent were used, such as Bentham's 'Flora Australiensis,' Martius's 'Flora Brasiliensis,' Ledebour's 'Flora Rossica,' Boissier's 'Flora Orientalis,' &c. After these great storehouses were exhausted, the smaller works and journals were entered on the sheets.

The first intention was to produce a modernised 'Steudel's Nomenclator'—indeed that was Mr. Darwin's wish; but from the first I maintained that references ought to be given; that whilst the value of a nomenclator which depends on synonymy diminishes every year,—a faithful index of the names of phanerogams published during the century and a half from 1735 to 1885 would be of permanent value. This conviction has strengthened as the work has gone on, and has partly helped to initiate a new departure. It was soon seen that anything on the lines of Steudel was quite impossible; that a reduction of species without examination would only create confusion and trouble afterwards to workers. Accordingly our plans were altered, so as to try and give a view of the actual state of Botany at the end of 1885, leaving it to monographers to fully settle questions of synonymy of doubtful species.

In minor points, again, Steudel's plan has been abandoned, so

that I have quite discontinued alluding to our work as 'Steudel,' and instead I term it the 'Index,' the precise title not yet having been settled.

During the earlier times of our labour I devoted myself to looking up some old authors, which previous experience had warned me would require special care. The whole work is so vast that it is quite out of the question for me to give much time to synonymy,—that I must take ready-made; our object is rather to put a trustworthy list of specific and generic references in the hands of the present generation of working botanists, than to aim at impossible perfection which would end in failure.

Our starting-point, then, is the publication of Linnæus's first edition of the 'Systema' in 1735, which he followed up by the 'Genera' in 1737; for Linnean names, naturally, Richter's 'Codex' with Petermann's 'Index' supply means for quickly referring to the first publication of a genus or species. Where Linnæus ascribes the genus to an earlier author, we say, 'Tourn. ex Linn.' &c., bnt do not refer directly to pre-Linnean literature. Where Linnæus's names, as given in his earlier works, were not followed in his 'Species Plantarum,' we follow the 'Species Plantarum,' e. g., *Ethusa*, *Brunella*, *Centauria*, for no specific names in the modern sense were appended to these genera by Linnæus, and we bring ourselves into harmony with later usage, by citing *Æthusa*, *Centaurea*, *Prunella*, as in the 'Species Plantarum.'

The first edition of the 'Species Plantarum' was issued in 1753, and that we must regard as the introduction of *nomina trivialia*, for the indexes to the 'Gothlandska resa' and the 'Pan Suecus' are lists of bare names without proper diagnoses. Starting hence, we find a small number of books, which came out in the interval between the first and second editions, containing many species, which were afterwards incorporated in the second edition of the 'Species Plantarum' with due acknowledgment, but, from the habit which most botanists of the early and mid parts of this century had of using only the second, have come to be regarded as Linnean. The younger Burman's 'Dissertatio de Geraniis' has nearly forty new species of Geranium, Jacquin's small octavo on West Indian plants nearly three times as many; Gouan's 'Flora Monsp.', and Hudson's 'Fl. Anglica,' all came out before Linnæus's second edition. Concerning the last, I have already published a note in this Journal for August, 1886, p. 244.

But whilst strenuously advocating strict priority as the only sure foundation for nomenclature, it can only be applied when free from doubt. *Cerastium viscosum* and *C. neglectum* have been so bandied about in opposite senses, that it is far safer to say *C. triviale* Link, and *C. glomeratum* Thuill.; here we have fixity of nomenclature, the most essential point. I regard names only as a means to an end, that of accurately marking a plant, and not as a means of displaying scholarship. A name is a symbol, and if it and the plant to which it belongs are firmly united, so that the name recals the plant without doubt, then it matters little how the name

originated, or if barbarous, or even inappropriate. To take a notorious instance:—Robert Brown published a genus as *Eleocharis*, which Lestiboudois altered to *Heleocharis*, as more accordant with the Greek, an alteration adopted by many subsequent writers, who nevertheless employ Beauvois's *Oplismenus*, which is equally faulty, without a sign of reprobation.

Whilst on the topic of fixity of name, I would remark that our practice is to take the name under which any given plant is placed in its true genus as the name to be kept up, even though the author of it may have ignored the proper rule of retaining the specific name, when transferring it from its old genus to the new, when at least such name is not already in the genus receiving the accession. To wantonly set aside the joint name thus given, and to publish a new name by joining the oldest specific name to the true generic, is a mischievous practice which should never be condoned; it is adding to the already vast mass of useless synonyms, and is more likely to be the offspring of vanity than of a sincere desire to promote science.

Useless synonymy is constantly being increased by botanists citing herbarium names other than those adopted; these names thus issued I have to account for, whilst from the very moment of publication they are only a burden to our lists. Further, it may be most unjust to the previous worker, who wrote a name possibly on the spur of the moment, and would not have published it on reflection.

The search I made in the principal early works in the period immediately following the use of the binomial method of naming, showed that a very large number of the authorities constantly quoted were incorrect, in so far as earlier authorities could be found. The plant which Linnæus called *Alsine media* figures in books of the highest reputation variously as *Stellaria media* of Smith, Withering, and Villar, but Nyman quite correctly cites Cyrillo, who was the first to remove our plant from *Alsine* to *Stellaria* in a scarce treatise. I have referred to the copy of this tract in the Banksian Library, and can verify the correctness of the citation; it is the only species for which the tract has to be cited.

I have by me a very long list of similar alterations, which at one time I intended to offer to the Editor of this Journal, but I have come to the conclusion that as it could be only a partial list, even to my own knowledge, numerous errors having been corrected in our lists without noting them particularly, it would not be worth the space to print.

I should like to mention some of our difficulties; one is the re-paging of separate memoirs. Our plan is, of course, to cite the place of first publication, and if it be in a journal or a society's publication, that is regarded as the first issue, and the separate reprint as later in date. But many societies and academies publish on such a wide field that botanical libraries, even of the first importance, are often without the original sets, although they may have copies of every botanical treatise so published. When

the original pagination is preserved, as in the American Academy, reference is easily made, but when, for instance, one of Grisebach's plants which is to be found on a certain page of the Göttingen 'Abhandlungen,' you need to know the constant of difference in order to use the reprint. I need hardly explain it further, but still I give the following case in illustration:—*Ranunculus lanci-petalus* Griseb. in Goett. Abhandl. xix. (1874), 69. The separate copies have a title-page, 'Plantæ Lorentzianæ,' and the same plant will be found on page 21; in this case the constant difference is 48.

This practice of re-paging, with perhaps a special title-page, leads to another troublesome practice, that of naming the title of the paper, instead of its position in the series. Hence time is often lost by looking for a separate word under a title, which requires the help of the Royal Society's Catalogue of Scientific Papers to make clear. The case just quoted shows this. Some excellent remarks on reprints which supply insufficient information as to their original source will be found in a footnote in Bull. Soc. Bot. France, v. (1858), 291.

Seed-lists are a terrible plague. Ephemeral in their nature, many of the names they contain would have perished in our literature had they not been republished in 'Linnæa' or the 'Ann. Sci. Nat.' They are so scattered and irregular that it seems impossible to gather up the new species from them, unless from some such codification as Dr. Urban has made for 1850–79.

Societies' publications and journals have the year added; it is a great help to finding the reference, and an additional check to the citation.

Local societies at home and abroad have issued sets of publications, which are frequently hard to find, or, if at hand, possibly imperfect.

Sets of distributed plants are not indexed, unless taken up by someone with a diagnosis, and are then cited through the publishing agent, e.g., *Hochst. ex A. Rich. Fl. abyss.*, &c.

Bare names are noted, when no other record exists, with (*nomen*) appended; if a description is given anywhere else subsequently, the latter is preferred.

A great point should be made of citing works in an abbreviation of the actual title, and not by translation. To render 'Abhandlungen, Verhandlungen, Afhandlingen, Transactions, Handlingar, &c.,' by 'Acta,' makes it doubtful what series is meant, when referring to the catalogue of a large library. 'Lam. Dict.' is an ugly way of citing the work which formed a portion of the task of the French Encyclopædistes. Worse still is 'Pall. Iter.', for here we are in doubt as to what edition and in what language. The original narrative was published in German, and if cited as 'Reise' we know that the original and not the French or English version is meant, which should be given as 'Voyages' or 'Travels' respectively.

It will be readily imagined that no long time was needed to show that, however desirable from the standpoint of accuracy, every

volume containing any species published should be searched, yet time for this more than lifelong task was wanting. I saw myself driven by the force of circumstances to rely more or less upon monographers, reserving such works for scrutiny as seemed specially to need it. Thus, after the classical works which were published during Linnæus's lifetime and the quarter-century after his death, only a few comparatively were gone over, page by page. We had to assume that down to 1850 the great bulk of names had been swept up by the various authorities previously named, and that date must be our starting-point for independent research. This date was fixed upon, because the volumes of Walpers's for the term 1850–51 proved so defective that they could not be trusted; for proof of this refer to the orchids and grasses, which are admittedly incomplete, and are even less complete than they profess to be.

Details of the subsequent work cannot of course be given; let it suffice to say, that of the important and troublesome journals and periodicals, I roughly classed them into groups of languages. With small exceptions the German, Dutch, Italian, Russian and Scandinavian journals are now represented in our lists, and some progress has been made on the French (which includes the Belgian), whilst some important English sets are in a forward state of preparation.

Independent works naturally have not been neglected, but convenience has been to a large extent our guide here; each book or set as it is extracted, is recorded on a suitable slip, which is kept sorted alphabetically, thus supplying a ready guide to what has been done.

It will of course be suspected that no one library has sufficed for our needs. The Kew library is rich, but help has naturally been sought for outside: other contributing libraries have been the Linnean and Royal Societies, and the libraries of the British Museum at Bloomsbury and at Cromwell Road; the latter being now a very fine one and easy to consult.

As a means of checking our work, M. Alphonse de Candolle has most kindly offered to supply me with the tickets he is in the habit of lending to monographers. These will be used in checking our lists, and supplying references to certain publications which might otherwise escape our notice.

In this rapid sketch I have necessarily passed by the details, and many points which tempt me to enlarge upon, as also upon help I am constantly receiving at the hands of many, whose assistance will more fittingly be acknowledged in due course.

I hope next month to give some remarks upon the nomenclature of our native plants, and thus to answer a large number of questions which have accumulated in my hands, chiefly relative to the London Catalogue, which press of occupation has hitherto prevented me from discussing.

(To be continued.)

LEJEUNEA HOLTII, A NEW HEPATIC FROM KILLARNEY.

By Richard Spruce.

(Concluded from p. 39).

The Flora of the British Isles can now boast of the following thirteen species of *Lejeunea*:—

1. *L. Mackaii* (Hook.).
2. *L. ovata* Tayl.
3. *L. hamatifolia* (Hook.).
4. L. Holtii Spruce.
5. *L. flava* (Sw.).
6. *L. patens* Lindberg.
7. L. serpyllifolia (*Dicks.*).
8. L. diversiloba Spruce.
9. *L. ulicina* Tayl.
10. L. minutissima (*Sm.*).
11. *L. microscopica* Tayl.
12. L. calcarea *Lib.*
13. *L. calyptrifolia* (Hook.).

All these *Lejeuneæ* grow in that south-west corner of Ireland of which Killarney may be regarded the centre, having the Atlantic Ocean to west and south, the Shannon to north, and the sources of the Lee and of the Kenmare River to east; roughly speaking, between $51\frac{1}{2}°$ and $52\frac{1}{2}°$ N. lat., and $9\frac{1}{4}°$ and $10\frac{1}{2}°$ W. long. The three species whose names are in roman type—*L. serpyllifolia*, *L. minutissima*, and *L. calcarea*—extend across the whole of Europe and Temperate North America: how far they may reach in Asia I know not, but Lindberg's 'Contributio ad Floram Cryptogamam Asiæ Boreali-orientalis' (Japan, Sachalin, R. Amur) does not enumerate a single *Lejeunea*. In Europe, *L. minutissima* grows as far south as 40° N. lat., at least, in Portugal, but does not get so far north as Scandinavia. In North America this species and *L. calcarea* extend southward to about 30° N. lat. in Florida. The two species whose names are in capitals—*L. Holtii* and *L. diversiloba*—are (so far as hitherto known) absolutely confined to Killarney. The remaining eight species, whose names are in italics, are limited to the British Isles, except that two of them—*L. ovata* and *L. ulicina*—reach across the channel into the westernmost parts of France; nowhere, however, so far east as to the meridian of London.*

Ten, therefore, out of the thirteen *Lejeuneæ* of our list belong to what we may call the Britannic type, being (with the slight exceptions above-mentioned) absolutely confined in the north temperate zone to the British Isles, so that if all, or any of them, are derivative species, they could not have been derived from continental Europe. Their ascertained distribution in Britain itself is very

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* *L. ovata* was found by myself in 1845 at Cauterets, in the Pyrenees (long. 0° 7′ W.), and I know not that it has been gathered elsewhere on the Continent. *L. ulicina* grows rarely near the coasts of Normandy and Brittany, but does not seem to spread farther east than to long. 0° 30′ W. *L. flava* is reported lately from Italy, and *L. ulicina* from Norway, but I have seen no specimens.

remarkable. The materials at our disposal—confessedly inadequate—go to show that in Ireland, outside the limits of the Killarney district, hardly any of these *Lejeuneæ* exist. *L. hamatifolia* was gathered by D. Moore in Sligo, but McArdle's more recent exploration of Ben Bulben and part of Donegal did not yield a single rare *Lejeunea*. The 'London Catalogue of British Muscineæ,' indicating Irish localities in the lump by the solitary letter "I," gives us no help on this head.*

On the western side of England, Wales, and Scotland, however, little by little, all these species of Britannic type (excluding the two peculiar Killarney species) have been found to exist. More than forty years ago Messrs. Lyon and Greville sent me *L. calyptrifolia*, *L. hamatifolia*, and *L. minutissima*, from the Isle of Arran (lat. 55° 35′ N.). In later times all the other species have been added by the researches of Ralfs, Curnow, Carrington, Pearson, Stabler, Slater, and others, the latest acquisition being the exquisite *L. microscopica*, which Mr. Pearson has detected in fine fruit not only near Keswick, but in N. Wales, near Dolgelly. *Jubula Hutchinsiæ* (Hook.), a very near ally of the *Lejeuneæ*, like them confined in Europe to the British Isles, has been found also in Cornwall and Devon, in N. Wales, and as far north in Scotland as the caves of Dunoon, on the Argyle shore. Species also of various other genera, once considered specialities of Killarney, have had their known distribution similarly extended, e. g., *Lophocolea spicata* Tayl. has been found by Wilson in Anglesey, and quite lately by Mitten in Cornwall. *Radula aquilegia* and *R. voluta*, *Adelanthus decipiens*, *Plagiochila tridenticulata*, &c., first found near Killarney, have been proved to exist equally near the coast of N. Wales and Cumberland; yet all these are either unknown on the Continent or in one or two cases extend a very little way within its western borders. *Radula Carringtoni*, however, *Scapania nimbosa*, and a few others, have not hitherto been met with out of the Killarney district.†

If it is a singular fact that so many *Lejeuneæ* should be peculiar to Britain, it is no less so that even there they should be mainly confined to the western and south-western coasts, not one of them, so far as I know, extending to the eastern side of our islands. Our

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* The coast of Ireland, with the exception of the south-western corner and the neighbourhood of Dublin, has been so little explored for hepatics that it is quite possible some of our Britannic species may extend far along the southern side of the island at least; and this is rendered more probable when we compare the distribution of mosses. *Hookeria lætevirens*, for instance, was first found near Cork, by Drummond; not until some years later at Killarney. *Daltonia splachnoides*, the most special, and the most tropical, of all our mosses, was first gathered on Secawn Mountain, near Dublin, therefore quite near the east coast, although afterwards found in greater plenty near Killarney. Taylor used to give a graphic account of how he crept out on a tree overhanging a waterfall at Secawn, to gather a tuft of moss growing at the end of a branch, and how it turned out to be the novel and elegant *Daltonia*. I was forcibly reminded of this when I found other species of the same genus in the Andes, and noted how they preferred to grow perched on the outermost twigs of bamboos, in very similar sites.

† This merely illustrative sketch of some salient features of the distribution of British *Hepaticæ* has no pretension to be an exhaustive account of it.

prevailing winds are westerly,—our gales all come from that quarter, and I have known them sufficiently violent to encrust our windows on the east side of Yorkshire with salt spray from the Irish Sea and Solway Frith,—yet if spores, or plants, of *Lejeuneæ* have occasionally been transported by this or any other agency right across the island, they have failed in almost every case to take root at a distance from the west coast. The only Britannic species I have seen east of the Pennine chain is *L. ulicina*, in Upper Wharfedale (long. about 2° W.), but the late S. Anderson gathered it at Saltersgate, within fifteen miles of the coast, in long. 0° 40′ W., on about the meridian of Vire, in Normandy, the only place where perianths of this species have been found. Yet, to say nothing of apparently congenial inland sites, we have many sheltered hollows and mouths of rivers and creeks, on the east coast of Britain, to which one might suppose these *Lejeuneæ* would have spread in the course of ages. The lower part of the course of the Cleveland Esk is through a calm sequestered vale, with sheltering woods, rocks, and waterfalls: rich in rare hepatics of European (or arctic) type—*Harpanthus scutatus; Liochlæna lanceolata; Cephalozia curvifolia, crenulata, connivens*, and *fluitans; Nardia compressa*, &c.,—but not possessing a single *Lejeunea*, except the common *L. serpyllifolia*.

The moister and more equable climate of our western shores, due to their being bathed by the gulf-stream, is the only existing cause we can assign for the persistent difference in the hepatic vegetation of the opposite shores of the British Isles. This seems at first sight inadequate to account for so great a discrepancy, which, however, is more than paralleled by the contrast, in plants of all classes, between the riparial vegetation of the South American rivers with white (or muddy) waters and of those with black (or clear) waters. Hardly a single tree, herb or moss, within reach of inundation of the Rio Negro, is found in a similar situation on the banks of the muddy Amazon. Of mosses, *Hydropogon fontinaloides*, which abounds on rocks and tree-roots bathed by the white waters of the Orinoco and Casiquiari, as far down the latter as to where it receives its last affluent, the black-water Pacimoni, there disappears, and is seen no more on the Casiquiari, nor throughout the whole course of the Rio Negro; yet reappears immediately below the mouth of the latter on the shores of the Amazon, as well as on the Japurá, its next large white-water tributary to westward. The aquatic, or amphibious, mosses of the Rio Negro are mainly a *Sphagnum* (!) fringing granitic islands for a few hundred miles of the upper course of the river, and in the time of flood sending out floating stems a foot long; and *Lejeunea inundata*, growing on riparial trees, in the wet season submerged, in the dry hanging from branches thirty feet overhead like wisps of hay. Neither species is ever seen on white-water rivers; and these are only a few out of many parallel instances that might be cited.

If we assume, what is indeed exceedingly probable, that certain peculiar hepatics first appeared in our islands about Killarney,—leaving out of question, for the present, how they came there,—and enquire by what agency they may have been transported to

Britain and dispersed along its western shores, we have first to consider how far it may have been affected by means of spores. It has been rashly taken for granted that there is no assignable limit to the distance the spores of *Muscineæ* may be conveyed by winds. I do not believe such to be the fact. In the first place mosses flourish most in sheltered situations, where violent winds are never or rarely felt. Moisture, shade, and a quiet atmosphere are essential to the existence of a great majority of the species. The sheltered position of the Killarney basin is well known. The three most prolific localities for mosses I have explored in the Andes are all notable for the almost perpetual calm that reigns there; and one of them is not a hollow, but a ridge, the lowest point of whose crest is 9000 feet above the sea. It runs east and west, and at its eastern extremity subsides abruptly to the confluence of two rapid rivers, running in very deep valleys, along which the easterly wind rushes with great violence. As we ascend the stony and bushy slope the wind gradually moderates, until in the last thousand feet we find ourselves in a wood where the only sound heard is usually that of the drip from the leaves of the trees, in whose tops the mist, or cloud, seems permanently hung. It may well be understood how mosses and hepatics abound there, and in three years that I frequently visited this spot I never felt more than the gentlest breeze, —oftenest none at all,—so that it well merits its native name, "Guayra-pata," *i. e.*, edge, or margin, of the wind.*

Consider, secondly, that the spores, albeit so minute, are often heavy enough to sink in water. They could not, therefore, be held in suspension in still air, or in air agitated by a gentle wind. In a gale, not only the spores but entire plants might be whirled aloft and deposited possibly at a great distance. We can conceive of spores, or mosses, being in this way borne across a narrow sea, but not over an ocean. Seeds of various phanerogams, furnished with pappus, or with broad thin wings, are far more likely to be transported long distances by the wind; yet where is the well-authenticated instance of the flight of any such seeds all the way (say) from America to Europe? The most usual way, however, in which the spores of ferns, mosses, &c., are dispersed is in the plumage, feet, and beaks of birds, and (on land) in the fur of animals. In 1852,

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* There are indeed a few mosses which prefer exposed sites, where they cling to rocks or walls, more rarely to earth, in dense tufts or patches, contenting themselves with a precarious supply of moisture, which their mode of growth enables them to store up against short periods of drought. These are mainly *Grimmiæ* and *Tortulæ*: the former abound exceedingly in the Pyrenees, the latter in the Andes, especially in the nearly treeless parts of those mountains. The capsules of these mosses, like those of many *Orthotricha*, seem to eject the main part of their spores in a mass, which may germinate where it first falls; or be rolled by winds or waters, or conveyed in the plumage of birds, to a distance, but does not disintegrate; thus giving rise to a cushion-like tuft wherever it finally settles and germinates. I need hardly say that no hepatics are similarly xerophilous. A certain amount of moisture is essential to their existence, and the more nearly perennial the supply the greater will be their luxuriance and variety. Shade, of trees, rocks, or clouds, is scarcely less essential.

when at the cataracts of the Rio Negro (lat. 0° 7′ S.), I went one day into the forest to shoot something for my dinner, and was fain to content myself with a spider-monkey, which I picked off the top of a tall slender tree while conversing with its mate. It fell into a dense bed of *Selaginella erythropus*, and on picking it up I noticed that its blackish fur had become brick-red. Giving it a shake, I was presently enveloped in a cloud of spores of the *Selaginella*, just then in full fruit. The presence of this *Selaginella* is a sure indication on the Rio Negro that the ground whereon it grows has been formerly cultivated. It speedily invades a deserted clearing, and converts the whole surface into what might seem a green meadow. When once established, it persists a great many years. A peculiar arborescent vegetation grows up simultaneously. What I had seen of the spore-laden fur of the monkey afforded a clue to the way the *Selaginella* obtained such speedy possession of the soil. I have been assured by inhabitants of the upper Rio Negro that the wild animals know perfectly well when a plantation is about to be abandoned, and from their hiding-places in the forest watch the preparations of the owners for migrating. No sooner has the last canoe-load fairly started on its way than the animals issue forth to occupy the deserted site. A Venezuelan Indian of San Carlos, removing with his family from a site which had ceased to be productive to one on another *caño*, where he had already cleared a plot of ground, did not get the last of his household gods embarked until long after sundown; but it was a night of bright moon. Scarcely had the canoe been shoved off when he noticed that he had left his cutlass behind, and turned back to fetch it. On reaching the hut it was a sight, he said, to see the number of wild animals already assembled: agoutis, pacas, armadillos, &c., capering about in wild delight—the agoutis even dancing erect on their hind legs! On the following day the fowls of the air would congregate there and indulge in similar orgies. This narrative might be coloured by the Indian's imagination, but I did not entirely disbelieve it; and I added the mental reflection that while both quadrupeds and birds might bring in their coats the seeds of the *Selaginella* and other weeds, the birds especially would bring in their stomachs the seeds of trees and bushes proper to cleared land, but nowhere to be found in the adjacent primitive forest. It is plain that the spores of mosses, lycopods, and ferns may be and are thus transported long distances, especially by monkeys, some kinds of which are far travellers, and by migrating birds: those aquatic birds and waders, for instance, that pass something like half the year on the Amazon and the other half on the Orinoco, where those rivers are a thousand miles apart.

To pass from the equator to latitude 54° 15′ N. Here, in North Yorkshire, our disused quarries, especially those of sandstone, whose upper strata are usually much softer than the lower, are soon tenanted by sand martins and rabbits, to whom is probably owing the beginnings of moss-vegetation. The martins, our earliest migrants of the swallow-tribe, may even bring with them germs of the moss-flora of countries bordering the Mediterranean, most of whose species are identical with those of our own flora, and all are

of arctic (not tropical) type. It would be interesting to watch, year by year, the peopling of such quarries with plants of all orders; to trace the origin of the first colonists, and of later arrivals to fraternise with or displace them. Some of our Yorkshire quarries, having lain undisturbed for a century or more, have become not only shady groves, but veritable moss gardens. As several hepatics prefer to grow upon mosses, it is rather an advantage to them to find the ground already occupied by the latter, which rarely derive any harm from their quasi-parasites.

When we come to consider the case of certain hepatics which, so far as we know, seem doomed to perpetual sterility, yet have spread far and wide, it is no longer a question of the dispersal of spores by any possible agency. Hepatics may be propagated, not only by spores, but (1) by gemmæ, of various forms, produced on the margins of the leaves or perianths; (2) by cell-suckers—minutely-leafy branchlets springing from a single cell on the surface of a leaf, more rarely of a stem or perianth.* Both these modes may exist also, although more rarely, in plants bearing perfect fruit, especially when exposed to excessive moisture, of which our *L. Holtii* is a notable instance, as I have seen five leafy suckers growing out of the surface of a single perianth. A single leaf, or even a fragment of a leaf, sometimes suffices for the production of a new plant, and in this way I have seen various *Plagiochilæ* propagated without fruiting. It is perhaps more frequent in mosses than in hepatics. Hardly any moss is more abundant in the Pyrenees than the large and handsome *Fissidens grandifrons*, yet only the male plant exists there. The thick leaves are very brittle, so that it is difficult to handle a tuft of the moss without mutilating the terminal leaves. Every morsel broken off is capable of producing a perfect plant, and I have occasionally caught one such in the act of budding and rooting. Several *Campylopi* are reproduced in this way, and are thus able to maintain and even extend their area, although never fruiting. Some mosses whose fruit is a great rarity are widely propagated by axillary bulbils, like *Bryum annotinum*, or by fascicles of deciduous branchlets, as in *Plagiothecium Borrerianum*.

Of *Lejeunea orata* and *L. ulicina* we have only the sterile female plant in the British Isles, nor has the male plant ever been found. Yet, although nowhere common, late investigations have shown both species to have a wide range on and near our western coasts, *L. ulicina* especially. If they first appeared in Britain at Killarney, where they still most abound, they could not have spread to England, Wales, and Scotland by means of spores, but by some agency which has transported them bodily, or portions of them capable of developing into perfect plants, to where they are now flourishing. *Metzgeria pubescens* is a far more striking instance of wide distribution of a species, which to this day is known only in barren state, although very common in hilly districts throughout not only

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* In the 'Phytologist' for March, 1845, I described and figured, from Killarney specimens, the cell-suckers of *Jungermannia adunca* Dicks. *Cf.* also the introduction to the genus *Plagiochila* in 'Hep. Am. et And.'

Europe, but the whole breadth of North America. All the plants I have seen are males, but Lindberg assures us he has found the two sexes intermixed in specimens from Vancouver Island, yet still no fruit. The fine *Mastigophora Woodsii*, although very rare and local, has a wide range: in Ireland, Brandon and Mangerton Mts.; in Scotland, Sutherlandshire; in Asia, the Himalayas; yet, so far as I know, only the male plant has hitherto been found. Very similar is the distribution of the uniformly sterile *Scapania planifolia:* Brandon Mt., North Wales, Lochnagar. Several others of our rarer hepatics are in similar case, e. g., *Jungermannia Orcadensis* and *Carringtoni*, *Plagiochila tridenticulata*, *Kantia arguta*, *Adelanthus decipiens*, *Radula voluta* and *Carringtoni*, &c., of which we have not yet found the fruit in Britain, where for the most part plants of only one sex appear to exist. We conclude, then, that the same agencies are available, and are in operation, for the dispersal of propagula of every kind as for that of spores.

We have seen that our peculiar *Lejeuneæ* cannot have reached us from the east, neither can they have come from the cooler parts of the North American continent, whose hepatics are almost identical with those of Continental Europe. Mitten's enumeration of the hepatics of British Columbia, &c.,* does not include a single species not found in Europe. Even Sullivant's 'Mosses of the United States east of the Mississipi' does not contain above two or three hepatics, growing north of the parallel of 40°, which we have not also in Britain. When we reach the Southern States, we meet with a few additional species of *Lejeunea* and *Frullania*, two of which, *L. clypeata* Schwein. and *L. lucens* Tayl., approach respectively our *L. Mackaii* and *L. diversiloba*, but are abundantly distinct. The nearest congeners, however, of our Britannic species of *Lejeunea*, and of some other genera, are to be sought not in temperate, but in tropical America, from the West Indies and Mexico to and beyond the equator. There, mainly in the wooded regions of the mountains and even of the hot plains,—more rarely in the subalpine region,—we encounter, not indeed the identical species of Britain, but their near allies or representatives. Several species resembling *L. Mackaii* in the entire stipules and flattened perianths grow, some in the plains, others in the hills. *L. ovata* is well represented; *L. hamatifolia* still better, all the species agreeing with it more or less closely in the slender hair-like stems, the narrow hooked and usually spinulose leaves, the bicrural stipules, and the armed keels of the perianth. *L. Holtii*, as already shown, resembles, not only in character but in its habitat, three or four *Lejeuneæ* found at the cataracts of two great equatorial rivers. *L. flava* (Sw.),† the identical species of Killarney, &c., is the commonest of all *Lejeuneæ*, not only in tropical America, but in all other hot countries (Madeira, West and East Africa, India, Philippine Islands, &c.).

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* 'Bryology of the 49th Parallel of Latitude.' Journ. Linn. Soc. 1861.

† Described by Lindberg (*op. cit.*) under the name *L. Moorei*, n. sp., but shrewdly suspected by him to be only a form of *L. flava*, which it really is, and exactly the same form as we have from Madeira and Jamaica.

L. patens, very abundant around Killarney, where it was first clearly distinguished by Lindberg, and now proved to have a wide range along the west side of Britain, has on Mts. Chimborazo and Tunguragua a very close ally in *L. cochleata* nob. *L. microscopica* has several tropical American representatives, none of which, however, has (like it) paroicous inflorescence. *L. calyptrifolia*, one of the most remarkable of all known *Lejeuneæ*, in one of its rare peculiarities, the possession of a double row of stipules, has perhaps a dozen representatives in tropical America; but its very rarest feature, the leaves convolute through most of their extent into a fusiform bag,—in some allied species into an extinguisher-shaped hood,—is reproduced in only two species found by myself in South America, both sterile and very scarce. A few other allied species are known, chiefly from eastern equatorial countries.*

We begin now to perceive that what we have chosen to call "Britannic" *Lejeuneæ*, &c., are in reality of tropical type; that they all have in the torrid zone representatives approaching them so nearly that we cannot doubt their having had a common origin at some period possibly not very remote. And here we must observe that, so far as the moss-flora alone is concerned, the whole earth divides naturally into two primary regions, the Arctic and the Tropical. We have seen what uniformity pervades the hepatic vegetation of the north temperate zone. The uniformity is no less striking when we compare the true mosses of Europe with those of temperate North America. A census I drew up twenty-three years ago, from such materials as I could command, showed that in certain of the more important genera the coincidence was almost complete. Thus, of 14 American species of *Dicranum*, 13 were European; of 6 *Dicranellæ*, 5; of 10 *Tortulæ*, 9; of 24 *Brya*, 23; of 10 *Mnia*, 9; of 7 *Bartramiæ*, 6; of 17 *Orthotricha*, 13; and the 5 American *Polytricha* were all European. Some groups of *Pleurocarpi* were nearly identical, in others there was greater diversity, and America could boast a greater number of peculiar forms. Many new species have since been added to both the European and the American floras, but have not shaken the fact of their essential conformity; so that bryologists can acknowledge no distinction of Palæarctic and Nearctic regions, but are compelled to combine them into a single region, the Arctic.

No sooner, however, do we cross the tropic of Cancer to southward than a very great change comes over the moss-flora. In

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* In a paper, "On Anomoclada, &c.," contributed to the 'Journal of Botany' for 1876, I ventured to identify a *Lejeunea* from the Quitenian Andes with *L. orata;* but I had then made only a preliminary examination of the Andine species, and a more scrupulous revision has obliged me to consider it distinct: it is *L. ancistrodes* Hep. Am. et And. 169, t. 5. A *Fossombronia*, too, cited in the same paper as *F. pusilla*, has proved very distinct, and it now stands as *F. crassifolia*, n. sp., *op. cit.* Since commencing the present paper I have had occasion to examine a specimen of *Lejeunea subsimplex* Mont. from Guadaloupe (*L'Herminier*), and on it I found four stems of a *Lejeunea* which I can only regard a variety of *L. calyptrifolia*, with a longer cuspis to the leaves, and the five spiniform projections at the top of the perianth so much lengthened that they may rather be called horns. There is no other difference, and all the plants, though so minute, are in perfect fruit.

Hepaticæ, certain genera represented in the Arctic region by but few species, most of them of rare occurrence, exist in the Tropical region in forms of almost endless diversity: such are *Lejeunea*, *Frullania*, *Plagiochila*, *Bazzania*, &c., the known species of the first-named genus amounting now to several hundreds, only three of which are, as we have seen, of universal distribution in the Arctic region. The familiar northern genera, *Scapania*, *Jungermannia*, &c., disappear, or exist only in the shape of few and rare species. Nor does this southern type cease on reaching the tropic of Capricorn, but is continued to the southernmost extremities of S. America and Africa, and to the Antarctic Islands, the flora of New Zealand showing a preponderance of the same tropical genera. It is true that as we advance southward certain European types reappear, and a few very peculiar genera are added on, enough perhaps to justify the adoption of an Antarctic subregion. This, however, is a question which does not concern us at present.

Passing along the northern tropic we find here and there a little overlapping and intermingling of tropical and arctic forms, but nowhere, not even in North Mexico and Northern India, do hepatics of tropical type intrude so far into the Arctic region as at Killarney. These quasi-tropical hepatics being, as already shown, nearly allied to species existing at this day in Tropical America, it may be argued that they are really migrants from that region, and that they owe their actual specific diversity to prolonged isolation and changed conditions of existence. This view may seem to derive probability from the fact that one of the specialities of Killarney, *Adelanthus decipiens*, exists there only in the male plant, and is of course barren; but plants of both sexes and fruit of a form of the same species were gathered by myself on the east side of the Quitenian Andes (lat. $1\frac{1}{2}^{\circ}$ S.) in 1857, and about the same time in Cuba by Wright. Along with the *Adelanthus*, in the Andes, grow two other hepatics, *Jubula Hutchinsiæ* and *Dumortiera hirsuta*, which also accompany the *Adelanthus* at Killarney; but these are to a certain extent cosmopolitan, being found in varying forms in many tropical countries, besides in temperate North America. Supposing, however, that our special hepatics have really migrated from tropical America, by what agency can that have been effected? Geologists will not allow us to call up an "Atlantis" from the vasty deep; nor are there any submerged islands, as between Madagascar and India, whose formerly protruded heads might have served as stepping-stones to partially bridge over the wide expanse of ocean. If we invoke the gulf-stream, in what way could it aid us? Mosses attached to floating logs would be destroyed by long immersion in brine. Were it not so, how comes it that in the Azores, in the very middle of the gulf-stream, almost the entire flora, mosses and hepatics included, is of arctic type, derived apparently from Europe, and that (so far as I know) not one of our Britannic *Lejeuneæ* exists there? *Hookeria lætevirens* and one or two other Azorean mosses are of tropical type, but Killarney can show a far greater proportion of such. Bermuda, although still a good distance from the American shore, is much nearer the tropic and the West Indies than the

Azores, and has a vegetation almost entirely derived from the Antilles and the coast of the Southern States, from the former partly by the agency of the gulf-stream, from the latter by that of birds, many of which it would seem are involuntary migrants, driven there by storms. The moss-flora appears to be very scanty; of hepatics I have only a few fragmentary specimens, all so near species inhabiting the Windward Antilles that they are probably modified forms of them; but not one of them corresponds to any of our Britannic species.

From what precedes, I conclude that no existing agency is capable of transporting the germs of our hepatics of tropical type from the torrid zone to Britain, and I venture to suppose that their existence at Killarney dates from the remote period when the vegetation of the whole northern hemisphere partook of a tropical character. If I am challenged to account for their survival through the last glacial period, I reply that, granting even the existence of a universal ice-cap down to the latitude of 40° in America and 50° in Europe, it is not to be assumed that the whole extent, even of land, was *perennially* entombed "in thrilling regions of thick-ribbed ice." Towards the southern margin of the ice the climate was probably very similar to that of Greenland and the northern part of Norway at the present day. The summer sun would have great power, and on the borders of sheltered fjords the frozen snow would disappear completely, if only for a very short period, and I ask only for a month or two, not doubting the capacity of our hepatics to survive in a dormant state under the snow for at least ten months in the year. I have gathered mosses in the Pyrenees where the snow had barely left them on the 2nd of August; by the 25th of September they were re-covered with snow, and would not be again uncovered until well on in the summer of the following year. The mosses of Killarney might even enjoy a longer summer than this, for the gulf-stream laves both sides of the south-western angle of Ireland, and its tepid waters would exert great melting power on the ice-bound coast, preventing at the same time any formation of ice in the sea itself.

My main object in this disquisition having been to account for the existence and dispersal of certain *Lejeuneæ* peculiar (at least in Europe) to the British Isles, I have only alluded in passing to other cryptogams whose head-quarters are at Killarney, whence they seem to have been dispersed to other parts of the islands—indeed are apparently still undergoing dispersal, in rare cases even to adjacent parts of the continent. But there are certain *Radulæ* which I cannot pass over without mention. *Radula voluta*, one of Taylor's numerous discoveries, is so near the Mexican *R. Xalapensis* that Lindberg holds them identical. The latter is considered by Stephani not distinct from the Andine *R. ramulina*. I have gathered two out of the three species, and believe them all three distinct, though acknowledging their close relationship. *Radula aquilegia* Tayl. comes so near the New Zealand *R. physoloba* Mont. that even Taylor himself was latterly inclined to regard them identical. Their differences are rather recondite, but I hold them specific.

These are curious instances of two species, unknown in the Arctic region outside the British Isles, having through their representatives a very wide range indeed in the tropical region. I will only add that the theory of certain cryptogams of tropical types having persisted at Killarney, possibly since Pliocene or even Miocene times, derives additional support from the presence there of a few animals which differ widely from all other European species, notably the elegant pond-snail, *Limnæa involuta*, in the waters of certain lakes, and the pretty spotted slug, *Geomalcus maculosus*, on their rocky borders. These molluscs, like the tropical hepatics, may have been able to resist the cold and the long winter sleep, which would be mostly fatal to animal life of higher grades, as they would be to all co-existing phanerogams of tropical types.

ERRATA.—Page 36, last line of text, *for* "♂" *read* "♪"; line 7 from foot, *before* "767" *insert* "389." Page 39, line 15, *after* "Nees!" *dele* "ined."; *L. cucullata* should be in small capitals, not in clarendon type.

A NEW BRITISH *RUBUS*.

BY EDWARD F. LINTON, M.A.

A *Rubus* which I have been investigating for about four years has eventually been admitted to be distinct from any named British or European varieties known to Prof. C. C. Babington or Dr. W. O. Focke. It has as yet only been found by me growing over a limited area in Sprowston, Norfolk (East), in two localities not half a mile apart; occurring in one of them here and there over part of a warren among furze and heather, in the other for a short distance only along a sandy hedge-bank. In general aspect and mode of growth like *R. Bellardi* Weihe, which is frequent in some of the copses of this neighbourhood, it differs considerably from it in the thinner armature, and the glabrescence of the more angular barren stem; and both Prof. Babington and, on a former occasion, Mr. J. G. Baker have referred it to the *Radulæ* section, the former expressing the opinion that it would stand near *R. scaber*. When gathering the growing plant, I have been struck by the glossy upper surface of the leaf: this feature is present in the leaves of the panicle, though most obvious in the barren shoot; and it has suggested to me the name of *R. lucens*—a name which I learn from Prof. Babington, who has invited me to publish a description of it, is not yet appropriated.

Rubus lucens Linton.—Stem weak, nearly prostrate, angular, occasionally rooting at the tip, glabrous or slightly hairy, with moderate unequal setæ; prickles small, slender, unequal, declining from a short narrow base; leaves *ternate*, finely sometimes doubly serrate; leaflets flat, rather thick, usually cuspidate, *shining* above, subglabrous, hairy and greenish-felted beneath, lateral sometimes but not commonly with a lower lobe, terminal obovate; panicle setose and densely hairy, its branches short, mostly simple, erect-

patent, its top racemose-corymbose, its prickles very slender, declining; rachis wavy, forming angles at each node; sepals hairy and felted, triangular-acuminate, reflexed. Primordial fruit-stalk short. Stamens exceeding styles.

SHORT NOTES.

Arenaria Lloydii Jordan as a British Plant. — On May 25th and 28th of last year the Rev. R. P. Murray and myself gathered, by the outlet of the Looe Pool and near Gunwalloe Church, and again between Sennen Green and Whitsand Bay, W. Cornwall, an *Arenaria*, which struck me as exceedingly distinct-looking. On comparing it with M. Lloyd's description of *A. Lloydii* in his 'Fl. de l'Ouest de la France,' I found it to coincide exactly with the characters there given, and accordingly sent fresh specimens to Mr. W. H. Beeby. He agreed with my opinion, but recommended caution, as the plant in question had several times been erroneously reported as British; and for some time the matter dropped. Lately, Mr. Arthur Bennett most kindly sent specimens from both neighbourhoods to M. James Lloyd, of Nantes, who replied: "Your [specimens of] *Arenaria* are indeed *A. Lloydii*, the same as ours." Prof. Babington, in a recent letter to Rev. R. P. Murray, adheres to his statement in the 'Manual,' ed. viii.: "I cannot distinguish *A. Lloydii*." Probably M. Lloyd is right, therefore, in placing it only as a var. of *A. serpyllifolia*, specimens of which, from Betty Hill, W. Sutherland, are intermediate between the type and the present plant. I have not examined the seeds, but the living Cornish plant was most characteristic. M. Lloyd's characters are: "Greener, usually rigid, 2–6 cent. high; panicle short, rigid; sepals with more strongly-marked nerves, fringed with arched hairs, not glandular; peduncles usually equalling the capsule." The bright green tint was very noticeable in my specimens when fresh, the leaves were very fleshy and coriaceous, and the whole plant remarkably asperous with short, stiff, bristly hairs. A prostrate form of the type grew with it at Sennen, and was much duller-coloured.—Edward S. Marshall.

Cornish Plants. — Last May, Rev. R. P. Murray and myself gathered a *Trifolium* with golden flowers, the colour being much the same as in *T. patens* and *T. Badium*. Mr. W. H. Beeby inclines to refer it to *T. procumbens* var. *majus* Koch, Syn. Germ., of which it has the characters, being an utterly different-*looking* plant from the form with pale yellow flowers, common on the sand in Surrey, &c. It occurs on the grassy slopes from Lizard Point to Rill Head. About Gunwalloe and Lizard Town we found, in some quantity, a *Myosotis* with white (or cream-coloured) flowers, and pale grey-green herbage, belonging to the *versicolor* group. Dried specimens were sent to M. Lloyd, and returned with the note: "I think *versicolor*." But it would be well worth while for any botanist visiting the district in early summer to send a few

fresh specimens to an expert, as the genus is (*fide* Mr. Geo. Nicholson) most difficult to judge of when dried. These plants were quite different in habit and mode of growth from the ordinary form of *versicolor*.—Edward S. Marshall.

Two new forms of Grasses for Britain.—*Agrostis alba* var. *subjungens* Hackel, nov. var.! Southport, Lancashire. "On sandy ground, July, 1884, F. C. King." "I never saw any form of this polymorphous species with so rigid foliage as in the present specimen. Perhaps this is due to local influence." (Prof. Hackel *in lit.*) This may be so; but on the sandy coasts of Norfolk, Suffolk, Essex, and Kent I have never seen anything like these specimens, and have never seen any such collected by others. It was collected for the Watson Bot. Ex. Club, and I hope Mr. King will again gather it, so that it may be widely known.

Festuca sciuroides var. *intermedia* Hackel. nov. var.! Mitcham, Surrey, 1884 to 1886, Arthur Bennett. "This is a very interesting new form, connecting *F. sciuroides* with *F. Myuros* L., of which it has the long inflorescence wrapped at the base by the uppermost sheath, while the characters of the spikelet are those of *sciuroides*." (Hackel *in litt.*). This grass has puzzled me for these three years past. In 1885 I sent specimens to Prof. Hackel, but they were sent too late and he wrote—"A puzzling form, looking somewhat anomalous and undeveloped. Please observe it next season." It is most abundant at Mitcham, and I hope to get a good supply this season for distribution through the Exchange Club.—Arthur Bennett.

Change of Colour in the Flowers of Anemone nemorosa.—To the carefnl observer it is apparent that the colour of certain flowers varies considerably according to the different classes of rock on which they grow, a fact that was never more forcibly brought home to me than during the past two or three years, when studying the blue form of our common wood anemone. This plant (*A. nemorosa cærulea*) is deepest in colour in a small scrub oak wood in the Penrhyn slate quarry, but as we recede from this point towards the old Half-way House, and where the transition from slate rock to the silurian and other gault takes place by insensible gradations, the flowers of this anemone pass through a series of intermediate shades, from deep purple to pure white. For part of the way the Ogwen River marks the boundary between the white and blue forms, so well defined is the mark of demarcation. I fancy, although I have not fully studied the matter, that the composition of the particular rocks on which the purple form of the wood-sorrel abounds about here will fully explain the transition of colour from white to purple in the flowers of this pretty little plant. Names of localities have been used rather freely in these brief remarks, but as the places are private and guarded the extermination of the plant is quite out of the question. — A. D. Webster.

Prunella vulgaris L. *var.* alba.—Two plants of this common continental form were found by me at Hinchwick Warren, near

Moreton-in-Marsh, Gloucestershire (on Cotswold Hills), in July, 1886. The seed was probably introduced with foreign corn, as the place is used as a training-ground for race-horses.—H. Weaver.

Burmannia bicolor Mart. in Africa.—The only species of *Burmanniaceæ* obtained by Dr. Welwitsch in Angola is not specifically distinct from *B. bicolor* Martius, a common South American plant occurring in Surinam, Orinoco, British Guiana, Cuba, and Brazil, as far south as Minas Geraes. The African plant differs in several small points from the American, and indeed some specimens would certainly from habit be considered as belonging to a distinct species. Dr. Welwitsch, however, collected so extensive a series of specimens that forms are to be seen which clearly connect both species. The most striking points of difference are in the increased number of flowers, sometimes as much as seven, which are crowded together in a head, and the shape of the perianth, the wings of which taper towards the base, giving it a cordate outline.

Burmannia bicolor var. *africana*. — Herba palmaris quam forma typica validior. Flores 1–7 congesti violacei laciniæ limbi exteriores flavæ carina purpurea interiores lineares lanceolatæ flavescenti albæ. Alæ tubi basi angustati, perianthii ambitum cordatum formans.—Angola, Huilla. In spongy woody meadows at Monino and Lopollo, growing with Eriocaulons, Xyrids, *Primulaceæ*, and *Scleriæ*. Flowering from February to May. In fruit in February. Gregarious but in few spots, *Welwitsch*, No. 6474! — H. N. Ridley.

Sibthorpia europæa L. in N. Devon. — I forward a specimen of *Sibthorpia europæa* L., gathered in June, 1885, near Lynmouth, N. Devon, from which vice-county it is not recorded in the second edition of 'Topographical Botany.' I found the plant very sparingly by the Lyn, on the western bank of the stream, about three-quarters of a mile above the bridge at Lynmouth.—David Fry.

Epilobium lanceolatum S. & M. in N. Somerset.—As this species does not appear to have been hitherto recorded from N. Somerset, I send you a specimen which I gathered in July, 1886, on the Coal Measures, close to the River Avon at Brislington, near Bristol, where, over a somewhat limited area, the plant is tolerably abundant, being associated with several of the commoner species of the same genus. *E. lanceolatum* has long been on record for W. Gloucester, where one of its stations is on the bank of the Avon, directly opposite to the spot in Somerset at which the plant has now been discovered, and on the same geological formation, so that its presence at the latter locality is not altogether surprising; and that this species has been so long overlooked at Brislington is no doubt due, in part, to the inaccessible and out-of-the-way position of the habitat.—David Fry.

EXTRACTS FROM REPORT OF BOTANICAL EXCHANGE CLUB FOR 1885.

Edited by James Groves, F.L.S.

Ranunculus Flammula L., var. *pseudo-reptans* E. B. On the margin of the western shore of Windermere, near the Ferry, Lake Lancashire, July 25th, 1885. This plant grows in dense patches in the lake, and in habit and characters it closely approaches the *R. reptans* L. which Mr. Bolton King sent from Ulleswater a few years ago; it is very distant from the coarse procumbent form of *R. Flammula* met with in exposed bogs and ditches. Dr. Boswell separates *pseudo-reptans* from *reptans* by the character of the internode, which in the former is described as "straight (not regularly arched), usually rooting only at the lower nodes," and in the latter by its being filiform and arched (Eng. Bot., ed. iii., vol. i., p. 34). I have collected the true *reptans* only once, on the edge of the Hitterdal Vand, in Southern Norway, and while the habit of the Windermere plant was very similar in its mode of growth, the thick straight basal internodes remove it from *reptans*. The Windermere specimens now sent will show that the apical internodes are regularly arched, and that all the apical nodes possess roots as in true *reptans*. The plant at the date of collection was wholly submersed, and I could not meet with any ripe fruit.—Charles Bailey.

R. pseudo-reptans. Near the Recess, Galway, W., Aug. 8th, 1885. A few plants were growing in a shallow of a rapid stream, with broad root-leaves curiously marked with brown blotches, which, I suppose, may come under this doubtful variety of *R. Flammula* L.—E. F. Linton. "This is quite different from Mr. Bailey's plant, and I should say not the var. *pseudo-reptans*."—J. G.

R. chærophyllus Auct. Mr. Arthur Bennett sends cultivated specimens grown from a root received from Dr. Bull, from Jersey. They are especially useful, as the plant appears to be extinct in the Channel Islands.—J. G.

Cerastium glaciale Gaud. Wet rocks, S. of Ben McDhui, W. Aberdeenshire, Aug. 22nd, 1885. I have so named it on Mr. Backhouse's authority. Is it *C. alpinum* var. *Smithii* of Hooker? There was not much of the plant, so I have only given the locality as part of the Ben McDhui group, W. Aberdeenshire.—H. E. Fox. "I think Hooker is correct, and that we have not the true *latifolium* in Britain. This I should therefore call *alpinum* var. I think that *glaciale* belongs to the true *latifolium*."—C. C. Babington.

Callitriche autumnalis L. In a pond formed by one of the streams which carry the surplus waters of Lough Mask into Lough Corrib, at Cong, on the boundary between counties of Galway and Mayo, Oct. 2nd, 1885. This is a rare Irish plant, from what I suppose to be the station published for District 8 in the 'Cybele Hibernica,' p. 264. The village of Cong is in County Galway

(Dist. 8), but the river which surrounds it is, for a short portion of its course, the boundary between Districts 8 and 9 of the 'Cybele Hibernica,' while the County Mayo lies immediately to the north and east of Cong. The locality whence the *Callitriche* was taken belongs to both divisions, and should be so quoted. In the botanical map, issued with the 'Cybele Hibernica,' Cong is placed about three miles to the east of its true position, and wholly within Division 9.—Charles Bailey.

Euphrasia officinalis L. Pasture, Skaill, Sandwick, Orkney, August, 1881.—H. H. Johnston. Linksness, Hoy, Orkney, August, 1885.—W. I. Fortescue. "Robust coast form of *E. nemorosa* H. Mart.; flowers unusually large."—F. Townsend. Moul Head, Deerness, Orkney, 1884.—W. I. Fortescue. "Stunted form of *E. nemorosa*."—F. Townsend. Smoo Cave and Hunda Island, W. Sutherland, and Braemar, Aberdeen, July, 1885.—H. E. Fox. "*E. gracilis* Fr."—F. Townsend. Reay, Caithness, July, 1885.—H. E. Fox. "*E. officinalis, pratensis* Fr."—F. Townsend. Ross Links and Bamburgh Links, Northumberland, July, 1885.—H. E. Fox. "*E. nemorosa*."—F. Townsend.

E. officinalis L. var. *maritima*. Downreay, Caithness, July, 1885.—H. E. Fox. "An unusual form of *E. nemorosa* H. Mart.; teeth of leaves remarkably blunt."—F. Townsend.

Potamogeton polygonifolius Pourr., var. Loch of Boardhouse, Birsay, Orkney, July and Sept., 1885.—H. H. Johnston and W. I. Fortescue. "I have little doubt that this has been seen by Dr. Boswell, yet I cannot but say I should place it under *natans* in the absence of fruit to decide its position."—A. Bennett.

P. polygonifolius Pourret, var. *angustifolius* Fries. This is a well-marked variety, named for me by Mr. Arthur Bennett. It occurred in a peaty pool at the foot of Stob-Derog, in Glen Etive, Argyle (Co. 98), at an altitude of 800 feet, not far from the stables near Kingshouse, where the Glen Coe coaches change horses, July 22nd, 1885.—Charles Bailey.

P. polygonifolius Pourr., var. *ericetorum*. Ditch running into Loch Laich, near Port Appin, Argyll, July, 1885.—Charles Bailey. "A more robust plant than what is usually so named. I think Dr. Boswell would call this typical *polygonifolius*."—A. Bennett.

P. polygonifolius Pourr., var. *fluitans*. Recess, Connemara, Galway, W., Aug., 1885.—W. R. Linton. "I am quite puzzled to know what Mr. Linton means. I do not know of any plant that Dr. Boswell has so named. Is it not a slip for var. *pseudo-fluitans* Syme? I think this must be the case, as the specimens are the same as sent by Rev. E. F. Linton, and from the same place and date. These specimens do not represent the plant as shown by the Edinburgh herb, to which Dr. Boswell refers as the most characteristic specimen he has seen. The only difficulty in assigning these Irish specimens to *natans* is the small spikes. It seems to me that the fruit alone can decide the true position of this form."—A. Bennett.

P. sparganiifolius Læst. Maam, Galway, Aug., 1885.—E. F. and W. R. Linton. "This seems fairly to agree with specimens

authentically named, but, in the absence of fruit, it cannot be held to be absolutely certain."—A. BENNETT.

P. Lonchitis Tuckerm. R. Boyne, Navan, Meath, Aug., 1885.—E. E. and W. R. LINTON. "Seems to agree very well with the American plant."—A. BENNETT.

P. nitens Web. Loch of Boardhouse, Birsay, Orkney, July, 1885.—W. I. FORTESCUE. "I have had this Birsay plant sent to me by Dr. Trail. It is a puzzle, but perhaps best placed under *nitens*. Of named forms, it comes under *P. borealis* Tis., which includes a series of forms departing from *nitens*, and approaching to *heterophyllus*."—A. BENNETT.

P. nitens Weber, var. *salicifolius* Koch. To this variety I doubtfully refer plants which grow in a swift stream (the Lusragan Burn) which drains the Black Loch, and runs snto the sea at Connel Ferry, near Oban, Argyll, July 21st, 1885. It is the prevailing *Potamogeton* of the stream, the only other species being the true *P. natans;* its stems were from one to three yards long, frequently many-branched, and bearing a profusion of flowering spikes.—CHARLES BAILEY. "Here again is a form that is not strictly *nitens* nor *heterophyllus;* similar plants are found in Perth and Donegal. It again comes close to one of the series of forms Dr. Tiselius names *P. borealis;* but this in habit and facies represents a wide range from specimens approaching to *Zizii* and *decipiens* to others near *nitens* and *heterophyllus*. I have not seen Koch's plant, so cannot say this is *not* it, so at present it must remain under Mr. Bailey's name." A. BENNETT.

P. flabellatus Bab. Ramsey brick pits, Hunts, August, 1885.—A. FRYER. "Doubtless correct, Mr. Fryer having submitted many of these forms to Prof. Babington."—A. BENNETT.

P. flabellatus Bab. I sent, two years since, the upper leaves of flowers of this plant from the R. Wey, Guildford, Surrey. It occurs in the weir-stream of Guildford Lock, and, in consequence of the rapid running water, the upper leaves do not spread in the characteristic fan-like form. I have since sent lower leaves to Professor Babington (who doubted the plant, see Report, 1883) and a living plant to Mr. Alfred Fryer, who finds that in still water it soon assumes its normal state, and the Professor now considers the plant to have been rightly named.—W. H. BEEBY.

Zannichellia pedicellata Fries. In a pit between Moreton and Leassowe, near Birkenhead, Cheshire, Aug. 29th, 1885. This is a new county record for No. 58, and a rather noteworthy one, inasmuch as it is the first report of its occurrence on the western side of Great Britain, unless there is a station for it on the west coast of East Cornwall (2). The specimens are somewhat poor, as they were infested with a dense confervoid growth, which made it difficult to detach more satisfactory specimens; but there is no doubt about the species.—CHARLES BAILEY.

Naias graminea Del., var. *Delilei* Magnus. With *Chara Braunii* Gmel., in the tepid water of the Canal at Reddish, near Manchester, Sept. 9th, 1885. Collected for Magnier's 'Flora selecta exsiccata'; and the few specimens sent are intended for our new members, and

to show that this plant still maintains its station. It is, however, much more limited in quantity than when first discovered in 1883, and only about half the stature of specimens which I have previously distributed through the Club. Whether this is due to increased canal traffic, or to frequent collection by botanists, I could not determine.—Charles Bailey.

Juncus supinus Mœnch., var. *fluitans* Lam. (Dict., iii., p. 271). Forming long bright green patches, at Maam, in the bed of the River Bealanabrack, which flows into Lough Corrib, County Galway, Oct. 3rd, 1885; also in the River Bundorragha, which runs into the Killary Harbour, opposite Leenane, County Mayo, Oct. 5th, 1885. The Rev. E. F. Linton, M.A., called my attention to this plant, as occurring in the river of Maam, and I tried to collect sufficient specimens there for our members; but the heavy rains of the late autumn had raised the river seven or eight feet above its normal height, which, with the turbid character of the flood-water, made the plant difficult to find, and I could only get about a dozen sheets of specimens. A day or two later I saw the same plant in abundance in the river below Delphi, in County Mayo, and the supply from this station will nearly go round the Club. Its habit is unlike a *Juncus*, and still less of *Juncus supinus*, but I have little doubt it is Lamarck's plant. It occurs in dense masses in the mud of the swiftly-flowing river, and suggests that a portion of the green sward had been undermined by the stream, and carried into the current which flowed over it; from this mass long tassel-like branches are seen waving in the river, with fine effect, as their light-coloured green capillary leaves were from six to twelve inches in length. Traces of fruit were very infrequent. It is difficult to keep its facies intact in dried specimens, but I took considerable pains to float out the leaves on paper under water, so as to preserve its habit as much as possible in the dried specimens.—Charles Bailey.

Bromus tectorum L. Near Thetford, Suffolk, W., June 3rd and 29th, 1885. This grass has not hitherto been regarded as having any claim to be British. I have myself gathered it before as a mere casual. The place in which I this year found it, and the quantity in which it grew, suggest, however, that its claim may be worth considering. Over a large sandy field, which appeared to be reverting from cultivation to its original condition of rabbit-warren, it was scattered freely, and also by a neighbouring roadside. On June 3rd it was so young that I did not recognise what it was, but at the end of the month I saw that the name which Mr. A. Bennett had meantime suggested was clearly correct. I send a good supply for distribution, as it was at least self-sown, and well-established, even if it has no right to be considered indigenous.—E. F. Linton.

NOTICES OF BOOKS.

Outlines of Classification and Special Morphology of Plants. By Dr. K. Goebel. Translated by Henry E. F. Garnsey, M.A., and Revised by Prof. I. B. Balfour, M.A., M.D., F.R.S. Oxford: Clarendon Press. 1887.

It would have been a misfortune had no translation been made of Goebel's 'Grundzügen' since it appeared as a new edition of Sachs 'Text-book of Botany,' Book II., with which British readers are familiar. The translator and the reviser may therefore be thanked at the outset for undertaking a too often thankless task. It may be remarked that the title-page of this version of the book, from the use of the terms "authorised" and "revised" and from the source of publication, creates a somewhat awe-inspiring impression derived from an obvious association of these terms with the title of a recent labour, which, however, has been the subject of criticism. I shall therefore not be deterred, especially since my intentions are not hostile. It is a pity if there has been delay in the actual work of printing and publishing the book. Prof. Balfour's preface implying the completion of the translation and revision is dated September, 1885, and the title-page is dated 1887. Such delay has manifestly not been caused therefore by translator or revisor, and we must grumble "at large" about the loss of time in bringing this excellent book before the public.

Though the original book has been in the hands of students since 1882, I may be permitted to describe its contents on this occasion of its appearing in our language. Book II. of Sachs' 'Text-book' (of which, as has been said, this is a new edition) was not its strongest portion, and the wisdom of entrusting the new undertaking to Goebel was fully proved by the success which he achieved. A "terminology based upon homology" is employed, and while admitting the consistency claimed for it, the present writer does not believe it to be the best system. A discussion, however, of that subject would lead away from the purpose of this notice. The first group dealt with is the *Thallophytes*, and the reform of classification at once engages the attention. The author begins with the *Myxomycetes*, and therein is distinctly in accord with the feeling of morphologists. Next he takes the *Diatomaceæ*, and though their removal from association with the *Desmidiaceæ* may not meet with so much general approval, nevertheless it may be held with much support that the isolation of this group is demanded, and at the best it bore only a superficial resemblance to the Desmids. The third group is composed of the *Cyanophyceæ* and the *Schizomycetes*, as was to be expected. The fourth group is the Algæ divided into three sections, the *Chlorophyceæ*, *Phæophyceæ*, and *Rhodophyceæ* (*Florideæ*). The fifth and last group of *Thallophytes* is the Fungi, in six sections: *Chytridieæ*, *Ustilaginеæ*, *Phycomycetes*, *Ascomycetes*, *Aecidiomycetes* (*Uredineæ*), and *Basidiomycetes*. It will be noticed that this arrangement of the Fungi is on the lines laid down by De Bary in the 'Botanische Zeitung,' 1881; and

though the divisions are not taken in precisely the same order as in De Bary's 'Vergleichende Morphologie und Biologie,' published after Goebel's book appeared in Germany, the arrangement is entirely in that spirit, and the reviser has done wisely in simply reproducing it. Taken altogether, this classification makes an advance very distinctly on the former system. It is to be understood that the above order does not coincide with the separation of the *Thallophytes* into equivalent groups. The service performed by the classification of *Thallophytes* used in Sachs' 'Text-book' was the pointing out that the presence or absence of chlorophyll was no reason for separating groups of plants morphologically related, though this lesson had already been taught by the systematists who have classified the flowering plants by recognising this principle in placing the flowering parasites without chlorophyll among their allies. This is forcibly pointed out in the short section on the classification of *Thallophytes*, and happily illustrated by the statement that "it is a matter of subordinate importance in the division of humankind into natural races, whether some support themselves by their own industry, and others live by war and plunder." Nevertheless in employing this principle Sachs went too far, in some cases with absurd results; and the arrangement here used and sketched above is a very decided improvement in recognising the two groups of Algæ and Fungi as there limited, though these do not contain all formerly comprehended under those terms. That such limitation is just is obvious enough.

After the *Thallophytes* there follow the *Muscineæ*, the *Hepaticæ* and *Musci* in a great group by themselves, and a third great group is composed of the Vascular Cryptogams. These are arranged into *Filicineæ*, *Equisetineæ*, *Sphenophylleæ* (a fossil heterosporous group), and *Lycopodineæ*. The *Lycopodineæ* include the *Lycopodiaceæ*, with *Lepidodendron* (a fossil heterosporous form), the *Psilotaceæ*, and the *Ligulatæ* (*Selaginelleæ* and *Isoeteæ*, which, as is pointed out in a note, "have scarcely anything in common but the presence of a ligule, and it would be better perhaps to make separate divisions of them").

The fourth great group embraces the "seed plants" or Phanerogams, treated with the most striking ability and thoughtful power. The author's lucidity of exposition is particularly impressive in his treatment of the embryology of this great group, and forms a contribution to botanical literature of the highest value.

Such, then, is an outline of this important addition to our literature. These groups are treated in as great detail as is desirable in a book which is not to lose its character as a text-book of classification and special morphology. The translator has done his work with care, patience, and skill, and it has been a work of no ordinary difficulties. He deserves the hearty thanks of botanists, and with him the reviser, not only for his notes, but for his judgment in forbearing to write notes too copiously. There was doubtless a temptation to bring the book up to date in some details, but work of this kind is often carried too far. That the book is published by the Clarendon Press is enough to say that it

is printed, &c., in a worthy way. Though as a matter of course the illustrations of Goebel's book are here reproduced, this makes yet another appearance of certain famous woodcuts with which one has no fault to find, but that they *are* getting a little tiresome. Some idle bibliographer ought to write a catalogue of the services of these veterans. That the facts they represent are unshaken and irrefragable in these changeful times is at all events a comforting reflection. Were the editor of this Journal disposed to offer a prize puzzle to those of his readers who have no access to this book I should recommend him to ask, "What are the Brittleworts?" *Corallineæ* and *Characeæ* would no doubt be favourite answers. How many would guess Diatoms?

G. M.

Lectures on the Physiology of Plants. By Sydney Howard Vines, M.A., D.Sc., F.R.S. Cambridge: University Press. 1886. Price £1 1*s*.

The publication of these lectures is intended to supply the need for a text-book of the physiology of plants, since at the time of the undertaking of the work there was none in the English language treating at all fully of the subject so as to meet the requirements of advanced students. Though Prof. Goodale's excellent volume recently noticed in this Journal has appeared in the meantime, the present one, on a more extended scale and with a different treatment of the matter, is none the less welcome. After an introductory lecture, the author discusses the subject in the following order. Lectures II. and III. deal with the structure and properties of the plant-cell; IV. and V. with the absorption of water and of gases; VI. with the movement of water; VII. with transpiration; VIII. with the food of plants; IX. to XIV. with metabolism; XV. with growth; XVI. to XXI. with irritability; and XXII. and XXIII. with reproduction. Finally, there is a copious and useful Index, and at the end of each lecture a bibliography of the special subject dealt with. The whole book occupies 710 pages, is excellently printed, and well illustrated. From this statement of the external characters and structure of the book it will be seen that care has been given to the order and the usefulness of it. A more minute examination only strengthens this impression, and convinces the reader that there is here the work of a man who has been undaunted by the vastness of the literature to be dealt with, who has spared himself in no way to ensure accuracy, and who understands from experience in teaching how most effectively to present the results of all this labour to his audience or readers. The natural conclusion from this would be that there is here an ideal text-book. In the view of many people that may be so, and the writer would be very sorry to interfere with the high estimate every one is bound to form of the book; and it is to be understood that its excellence provokes this criticism. Though the impression is left on the reader throughout that the author is familiar with the things he describes, and that he has given them indeed much

thought, there is at the same time an almost total absence of that quality which distinguishes a text-book written by a great investigator. At first sight this criticism may appear to be one more of the author than of his book, but the writer entirely disclaims any such interpretation of it. It is perfectly legitimate, since here it represents a well-marked character of the book, one not interfering with its usefulness—possibly promoting it; but nevertheless appealing to one whose function it is to estimate its position in the literature of Botany. The want of this particular kind of power at once distinguishes it from such text-books as we have from the pen of de Bary, Sachs, and others less known. Let it not be said, however, that there is an absence of originality in the treatment of the subject. There is not only originality, but it has a highly beneficial effect in making the book remarkably readable and stimulating to the student. Dr. Vines may be congratulated on having produced the most excellent and exhaustive treatise on plant physiology in our language, and it may be anticipated with confidence that its effect on the progress of the subject in this country will be marked first by more effective teaching, and next by more investigation. G. M.

Handbook of Practical Botany. By E. Strasburger. Edited from the German by W. Hillhouse, M.A., F.L.S. London: Swan Sonnenschein, Lowrey & Co. 1887.

Prof. Hillhouse has translated the very excellent and useful book published by Strasburger in 1884. Strasburger indeed published two books on Practical Botany during that year, 'Das Botanische Practicum' and 'Das Kleine Botanische Practicum.' The latter was intended for beginners, and it is this book which has been translated. This fact appears only on a comparison of the contents of the books, and perhaps in another edition it may be distinctly stated on the title-page. Though books on Practical Botany multiply, there is plenty of room for this one. Prof. Strasburger's name is a guarantee for the excellence of any treatise he may write on this subject, and in this case the usefulness of his work is beyond question. The translation is not remarkably well done, and its faults are common to all translations but the very best, except that here they are plentiful. Great pains have been taken to ensure accuracy, and there is not much to complain of in this respect—the most important. But in a new edition it should be possible to purge the text of such phrases as "a single such objective," &c. Apart from this, the addition of the book to our literature is to be welcomed, and that it will do good service in the education of botanists may be safely anticipated. G. M.

Manipulations de Botanique. By Paul Girod. Pp. 72. 22 Plates. Paris.

This little book is one of a series adapted for practical work in the laboratory. The first part treats of the method of using the microscope, reagents, &c., the rest of the book consisting of a series of original diagrams by the author illustrative of the histology and anatomy of typical plants, from Dicotyledons to Algæ, ending with cell-tissue for purposes of comparison with unicellular organisms. Short notes explaining the methods of preparing sections, to show what is seen in the diagrams, accompany the plates. The work is hardly sufficiently detailed for a beginner working by himself, but as a demonstrator's handbook to a course of practical vegetable histology it seems quite satisfactory. H. N. R.

New Books. — T. W. Shore, 'Elementary Practical Biology Vegetable' (London, Churchill: 8vo, pp. viii. 173: price 5*s.*)— G. Berthold, 'Studien über Protoplasma mechanik' (Leipzig, Felix: pp. xii. 332, iv. tt. 7). — G. Bentham, 'Handbook of the British Flora': ed. v., revised by Sir J. D. Hooker (London, L. Reeve: 8vo, pp. lxxx. 584: 10*s.* 6*d.*).

Articles in Journals.

Bot. Centralblatt. (Nos. 4–7). — J. MacLeod, 'Untersuchungen uber die Befruchtung der Blumen.' — (Nos. 4–9). H. Steininger, 'Beschreibung der europäischen Arten des Genus *Pedicularis*.'— (No. 8). V. Borbás, 'Die Knospengallen einiger Eichen in der Form von Eichelgallen.' — (No. 9). O. Boeckeler, 'Ueber ein vermeintlich neues Cyperaceen.'

Botanical Gazette (Jan.).—C. R. Barnes, 'Revision of N. American species of *Fissidens*.' — N. L. Britton, 'Columbia College Herbaria.'—J. M. Coulter & J. N. Rose, '*Umbelliferæ* of E. United States' (1 plate).

Bot. Zeitung (Jan. 21).—F. Hildebrand, 'Experimente über die geschlechtliche Fortpflanzungsweise der Oxalisarten.' — H. Hoffmann, 'Culturversuche über Variation.'—(Jan. 28). J. Wortmann, 'Ueber die rotirenden Bewegungen der Ranken.'

Bull. Torrey Bot. Club (Feb.).—C. H. Kain, 'Notes on Diatoms.' —E. E. Stern, 'Inflorescence of *Camellia japonica*.'

Gardeners' Chronicle (Feb. 5). — *Masdevallia Wendlandiana* Rchb. f., *Spathoglottis Regnieri* Rchb. f., spp. nn. — G. Maw, 'The Species of Crocus.' — *Narcissus cyclamineus* (fig. 46). — (Feb. 12). *Ornithidium ochraceum* Rchb. f., n. sp. — *Kalanchoe carnea* (fig. 48). (Feb. 19). *Restrepia pandurata* Rchb. f., *Phalænopsis Foerstermanni* Rchb. f., spp. nn.—(Feb. 26). F. W. Burbidge, '*Narcissus Pseudonarcissus* var. *Johnstoni* Tait' (fig. 60). — W. G. Smith, '*Cordyceps Taylori*' (fig. 62).

Journal de Botanique (No. 1, Feb. 15). — G. Bonnier, 'La Constitution des Lichens.' — J. Costantin, 'Observations sur la Flore du littoral.'—E. Bondier, 'Deux nouvelles espèces de *Ptychogaster*' (*P. citrinus* & *P. rubescens*) (1 plate).

Oesterr. Bot. Zeitschrift (Feb.). — H. Zukal, 'Zur Frage vom grünfaulen Holze.'—J. Ullepitsch, *Alyssum calycinum* β. *perdurans*, n. var. — F. Krasàn, 'Ursachen der Haarbildung.' — V. Borbás, 'Rhamni Hungariæ.'—A. Hausgirg, 'Bergalgenflora Böhmens.'—A. Heimerl, 'Flora von Pondichery.'

LINNEAN SOCIETY OF LONDON.

January 20*th*, 1887. — William Carruthers, F.R.S., President, in the chair.—Mr. John Benbow and Mr. Fiennes S. Y. Cornwallis were elected Fellows of the Society. — The President made a presentation of a portrait in oil of Francis Masson, F.L.S. (elected 1796), known as a gardener of repute and as a successful collector of living plants from South Africa (for his biography see Journ. Bot. xxiii. (1884), p. 114).—Prof. Bayley Balfour exhibited specimens and showed the microscopic structure of the "ginger-beer plant.' He pointed out that, although well known to, and used by, many people as a means of manufacturing an acid drink out of sugar-solution and ginger, yet no scientific account of the organism had appeared, except a short note by Mr. Worthington Smith in the 'Gardeners' Chronicle.' It has the appearance of a white nostoc, and is composed of a bacterium passing through all forms of rods, coils and filaments, which apparently constitutes its greater part; and associated with this is a sprouting fungus. Judging from descriptions and figures by Kern of the "Kephir," used in the Caucasus to induce fermentation in milk, the ginger-beer plant closely resembles this; but there are many points of difference. As one tradition of the introduction of the ginger-beer plant to Britain is that it was brought by soldiers from the Crimea, the resemblance is interesting. Prof. Balfour expressed a desire to have specimens of the ginger-beer plant from different localities, and hoped that any Fellow who could obtain it or throw light on its history would communicate with him. — Mr. Dyer showed and made remarks on specimens of dried arctic alpine plants from the Corea.—A paper was read by Francis Darwin and A. Bateson, "On the Effects of Stimulation on Turgescence in Vegetable Tissues." The following are the more important results enunciated:—(1) Turgescent pith placed in water increases in length, at first slowly, then more quickly, and then again the rate of increase becomes slow; (2) the rate of increase in length increases as the temperature of the water rises, reaches an optimum, and suddenly falls as a temperature sufficient to cause flaccidity is reached; (3) the following reagents cause distinct acceleration, *viz.*, alcohol, ether, ammonia,

and hydrocyanic acid: the first three cause a very temporary effect, whereas prussic acid has a prolonged action; (4) the following reagents produce retardation, *viz.*, acetic acid, hydrochloric acid, and probably nitric acid; (5) dilute solutions of quinine, of quinine chlorate, and carbolic acid produce a remarkably rapid shortening of the pith. The authors incline to believe that physical causes are not solely the agent in the results obtained in these experiments, but that the protoplasm is endued with a vitality of its own, and one on which chemistry throws but a feeble light. — Mr. J. Reynolds Vaizey read a paper, "On the Anatomy, Development, and Morphological Equivalence of the Tissues of the Sporophore of Mosses." The seta of mosses consists of an outer sclerenchyma, within which is parenchymatous tissue, and in the middle the "central strand," this latter being surrounded by a single layer of cells forming the endoderm derived from the outer meristem of the growing apex. It consists of two forms of tissue, one being of thin-walled prosenchymatous cells destitute of protoplasm, their function being to conduct water; this the author terms "prosylem." Surrounding this is a second cylinder of elonguled cells with thickened walls, containing granular protoplasm; this tissue he terms "prophloëm." On tracing the prosylem downwards, it is found that it gradually encroaches in the other tissues by the "foot," until it takes on the character of conducting tissue. The stomata on the theca are confined to the hypophysis; the form of stomata in which the guard-cells communicate is internally typical only of *Polytrichaceæ* and *Funaria*. In the young sporagonium five distinct meristems occur with different laws of cell-division; one form with an axial solid cylinder he terms "endomeristem." It gives rise to the central strand in the seta and in theca to so much of the tissue of the columella as lies within the sporagenous zone; the cells round this being derived from the epomeristem, whilst the sporagonom layer is itself derived from the endomeristem. The hypophysis is an absorbing and assimilating organ, and performs all the functions of a leaf, and should be classed as a phyllome. The water-conducting tissue of the sporagonium only differs from the xylem of vasculares in the absence of spiral thickening and lignification of the cells. The protoplasm differs even less from the phloëm of some vasculares, and though no sieve-like tubes have been made out, yet they are wanting also in some vasculares, e.g., *Selaginella*. The author compares the development of the sporagonium in some respects to certain parasitic plants; and he draws the conclusion that the *Muscineæ* are descended from an ancestor common to them, and vasculares similar to the *Anthoceroteæ*; finally hoping in a future paper to deal with their phyllogeny, specially referring to the vascular system and its homologue, the central strand of the Musci.

THE FERNS OF TRINIDAD.

By G. S. Jenman, F.L.S., Government Botanist, Demerara.

My friend Mr. R. V. Sherring lately submitted to me for determination the collection of ferns he made in Trinidad last winter after he left Jamaica. The set numbered seventy-five species, including a few Lycopodiums and Selaginellas. Several proved new to the island. In working out the set, having determined to merge my Jamaica monograph into one of the whole of the British West Indies and Guiana—the majority of the Jamaica species covering the whole of this range—I made a complete list of the Trinidad species, which I herewith annex. The writings I have consulted are:—Eaton's determination of Fendler's collection of Trinidad ferns, in the 'Botanical Gazette,' Nov., 1878; Hooker and Baker's 'Synopsis Filicum'; Fée's 'Histoire des Fougères des Antilles'; and Grisebach's 'Flora of the British West Indian Islands.' Mr. Baker has been good enough to write me descriptions of two new species in Fendler's set. The ferns of all the British West India Islands, except Jamaica, have been very imperfectly recorded, and to stimulate local observers and collectors I hope to be able to give lists in a short time of those of the other principal islands. Trinidad partakes largely of the adjacent continental flora, from which it is separated only by a few miles. Several of the otherwise peculiarly mainland species and varieties, which, for instance, are the commonest of any in Guiana, are found in Trinidad, but do not extend further among the islands. The majority are however widely spread Tropical American plants. The endemic species are few, so few as to be counted on the fingers of one's hand. The most interesting is the peculiar and long-known *Hypoderris Brownii*, one of the most remarkable types in the West Indies. Like most of the West India islands, Trinidad possesses a very diversified surface, rising from sea-level, by immumerable ridges and valleys, to 3012 ft. elevation. The mountains are forest-covered, as are also many of the lower slopes. The area is about 1800 square miles.

Hymenophyllum polyanthos *Swartz.*
H. hirsutum *Swartz.*
H. sericeum *Swartz.*
H. ciliatum *Swartz.*
Trichomanes punctatum *Poir.*
T. pusillum *Swartz.*
T. Krausii *Hook. & Grev.*
T. membranaceum *L.*
T. muscoides *Swartz.*
T. Ankersii *Parker*, var. T. brachypus *Kze.*
T. pinnatum *Hedw.*
Trichomanes spicatum *Hedw.*
T. elegans *Rudge.*
T. sinuosum *Rich.*
T. Kaulfussii *Hook. & Grev.*
T. crispum *L.* var. T. pellucens *Kze.*
T. alatum *Sw.*
T. Bancroftii *Hook. & Grev.*
T. macilentum *V. D. B.*
T. pyxidiferum *L.*
T. Prieurii *Kze.*
Alsophila sagittifolia *Hook.*

Alsophila Eatoni, n. sp.—Caudex erect. Stipites armed with short curved spines. Fronds tripinnate, chartaceous, pellucid, glabrous, dull dark green above, pale beneath. Pinnæ patent, lower ones much reduced and shortly petiolate, those above these sessile, oblong-lanceolate, acuminate, 12–16 in. long, 4 in. broad. Pinnulæ sessile, unequal-sided toward the base, the upper side the deeper, acuminate, 2–2½ in. long, ½ in. broad, about a score to a side, with a space half their own width between them, cut two-thirds to the costules into close oblique oblong obliquely rounded quite entire lobes, which are 1½–2 lin. wide by 2 lin. diam. to the sharp close sinus, the space between the sinus and costule being 1½ lin. diam. Rachis and costæ wood-brown, the latter puberulous, both gray pubescent down the face; costules also slightly pubescent above, beneath clothed with very minute dark brown bullate scales, and puberulous. Veins simple, pellucid, 4–5 to a side, lowest pair terminating just above the sinus. Sori small, medial, occupying three or four of the veins on each side. Receptacle small, scaly. Maraccus; collected by Mr. Sherring. Intermediate between *oblonga* and *procera*. Likely this is either No. 32 or 112 of Fendler's Ferns, both of which are ascribed to *A. nitens* J. Sm., which, as Smith's specimens in the British Museum show, is *A. aspera* R. Br., a Jamaican species not found in Trinidad *.

Alsophila ferox *Presl.*
Hemitelia grandifolia *Spring.*
H. horrida *R. Br.*
Hemitelia multiflora *R. Br.*

Cyathea pubescens Mett. — A specimen in the British Museum Herbarium, collected by Lockhart in Trinidad and named *C. Serra*, belongs to this species.

Cyathea Schanschin Mart.—This Fendler's No. 80 Eaton did not determine. Mr. Baker has identified it with this, and writes:—"Fendler has sent a fine caudex of this plant, which completes the proof of its identity with a species now known to be widely distributed in Tropical America."

Hypoderris Brownii J. Sm.—This was taken to be *Pheyopteris draconoptera* in Eaton's List.

Dicksonia cicutaria *Swartz.*
Davallia Saccoloma *Spreng.*
D. inæqualis *Kze.*
Lindsaya falcata *Willd.*
L. trapeziformis *Dry.*
L. guyanensis *Dry.*
L. stricta *Dry.*
L. parvula *Fée.*
Adiantum lucidum *Swartz.*
A. macrophyllum *Swartz.*
A. villosum *L.*
A. pulverulentum *L.*
A. Kaulfussii *Kze.*
A. obliquum *Willd.*
A. intermedium *Swartz.*
A. hirtum *Klotzsch.*
A. polyphyllum *Willd.*
A. obtusum *Desv.*
A. triangulatum *Hook.* var. acuminatum *Mett.*
A. tetraphyllum *Willd.*
A. capillus-veneris *L.*
A. tenerum *Swartz.*
Hypolepis repens *Presl.*

* This appears to be Fendler's No. 32, but not his No. 112, which for the present I classify as a form of *A. aspera* R. Br.—J. G. B.

Cheilanthes radiata *R. Br.*
Pteris litobrochioides *Klotzsch.*
= P. pungens *Willd.*
P. quadriaurita *Retz.*
P. podophylla *Swartz.*
P. inæqualis (*Fée*).
P. aculeata *Swartz.*
P. gigantea *Willd.*
P. aquilina *L.* var.
Blechnum Lanceola *Swartz*, var.
B. longifolium *H. B. K.*
B. occidentale *L.*
B. serrulatum *Rich.*
B. volubile *Klf.*
Asplenium serratum *L.*
A. pumilum *Swartz.*
A. obtusifolium *L.*
A. cultrifolium *L.* var.
A. salicifolium *L.*
A. auriculatum *Swartz.*
A. lætum *Swartz.*
A. lunulatum *Swartz.*
A. auritum *Swartz.*
A. cuneatum *L.*
A. cicutarium *Swartz.*
A. rhizophorum *L.*
A. grandifolium *Swartz.*
A. celtidifolium *Mett.*
A. Shepherdii *Spreng.*
A. crenulatum *Baker.*
A. radicans *Schk.*
A. marginatum *L.*
Didymochlæna lunulata *Desv.*
Oleandra neriiformis *Cav.*
O. nodosa *Presl.*
Nephrolepis exaltata *Presl.*
N. acuta *Presl.*
Nephrodium subquinquefidum *Hook.*
N. amplum *Baker.*
N. effusum *Baker.*
N. conterminum *Desv.*, var.
N. Sprengelii *Hook.*
N. falciculatum *Desv.*
N. patens *Desv.*
N. Sloanei *Baker.*
N. deflexum *J. Smith.*
N. guadalupense, *Fée.*
N. molle *Desv.*
N. brachyodon *Hook.*
N. cicutarium *Baker.*
N. macrophyllum *Baker.*

Nephrodium Sherringiæ, n. sp.—Stipites erect, 2–3 ft. long, rather slender, glossy brown, paleaceous at the base. Fronds ample, 1½ ft. long or more and nearly as wide. Simply pinnate, chartaceous, pellucid, dark green, glossy. Pinnæ comprising three opposite pairs and a large terminal one, the lowest pair a foot long, 3–4 in. wide above the base, stalked to 1¼ in. with a large connected lanceolate-acuminate lobe at the inferior base 4–6 in. long and 1–2 in wide, and a smaller one on the opposite superior base; next pair of pinnæ similar but somewhat reduced; upper pair sessile and unequally cordate at the base and devoid of basal lobes; terminal pinnæ similar to the inferior pair. Primary veins costæform, intermediary venules arched, connected by a copious network, the areoles containing free branches. Sori rather small, very copious, scattered over the whole under surface. Involucres persistent, but curled up at maturity. Maraccas; collected by Mr. R. V. Sherring, after whose wife, recently deceased, I have named it by request. This has the size and habit of *macrophyllum*, but the pinnæ are fewer and the sori instead of being serial are sprinkled generally over the surface, a rare character in the American species of *Sagenia*.

Aspidium semicordatum *Swartz.*
A. aculeatum *Swartz.*
A. abbreviatum *Schrad.*
A. meniscioides *Willd.*
A. plantagineum *Griseb.*

A. trifoliatum *Swartz.*
Polypodium blechnoides *Swartz.*
P. flavopunctatum *Klf.*
P. tetragonum *L.*
P. megalodus *Schk.*
P. crenatum *Sw.*
P. serrulatum *Mett.*
P. trichomanoides *Swartz.*
P. jubæforme *Klf.*
P. pendulum *Swartz.*
Polypodium pectinatum *L.*
P. sororium *H. B. K.*
P. incanum *Swartz.*
P. loriceum *L.*
P. neriifolium *Schk.*
P. chnoodes *Spreng.*
P. fraxinifolium *Jacq.*
P. aureum *L.*
P. decumanum *Willd.*
P. crassifolium.
P. Phyllitidis *L.*, var. P. costale *Kze.*
P. piloselloides *L.*
P. vacciniifolium *F. & L.*
P. lycopodioides *L.*, var. P. salicifolium *Willd.*

Polypodium nematorhizon Eaton in Amer. Bot. Gaz. Nov. 1878.—Rhizome thread-like. wide-creeping, clothed with small lanceolate bright brown membranous paleæ. Fronds sessile or nearly so, simple, lanceolate, acuminate, 3–7 in long, $\frac{1}{2}$–1 in. broad at the middle, entire, narrowed to both base and apex, moderately firm in texture, glabrous, with a few paleæ on the midrib beneath. Areolæ in about three regular rows between midrib and margin. Sori round, superficial, forming a single row nearer the edge than the midrib, occupying the tip of one or two free veins in the middle row of areolæ.

Hab. Trinidad. Fendler No. 73. "Habit of *lycopodioides.* Barren and fertile fronds similar."

Gymnogramme pumila *Spreng.*
G. calomelanos *Klf.*
Hemionitis palmata *L.*
Arctium citrifolium *Splitg.*
Antrophyum cayennense *Klf.*
A. subsessile *Kunz.*
Meniscium serratum *Cav.*
M. reticulatum *Swz.*
Tænitis Swartzii *Jenman* = Polypodium elongatum *Mett.*
T. angustifolia *R. Br.*
T. furcata *Willd.*
Vittaria lineata *Swartz.*
Monogramme seminuda *Baker.*
Acrostichum simplex *Swartz.*, var. martinicensis *Desv.*
A. Lingua *Radd.*
A. alatum *Fée.*
A. flaccidum *Fée.*
A. luridum *Fée.*
A. sorbifolium *L.*, var. A. yapurense *Mart.*
A. cervinum *Swartz.*
A. caudatum *Hook.*
A. osmundaceum *Hook.*

Acrostichum (Gymnopteris) **Fendleri,** Baker n. sp.—"Rhizome stout, creeping. Stipe of barren frond above a foot long, dull brown, naked. Lamina ovate-lanceolate, simply pinnate, membranous, glabrous, 15–18 in. long, 8–9 in. broad. Pinnæ 5–6-jugate, sessile, oblong-lanceolate, entire, acute, $1\frac{1}{2}$–2 in. broad. Main veins arcuate, parallel, produced to the margin, very distinct, $\frac{1}{4}$–$\frac{1}{3}$ in. apart, connecting veinlets 14–15, arched, with a single vein from the apical angle, as in *Meniscium.* Fertile frond similar, but pinnæ smaller and stipe longer. Trinidad, Fendler No. 88!" This has entirely the habit of *Acrostichum* (*Gymnopteris*) *nicotianæfolium,*

both in fertile and barren fronds, but the venation is strictly that of *Meniscium*, in which genus Eaton placed it. It is found also in Guiana.

Acrostichum nicotianæfolium *Swartz.*
A. alienum *Swartz.*, var. Pardicei *Griseb.*
A. aureum, *L.*
Gleichenia pubescens *H.B.K.*
G. pectinata *Presl.*
G. dichotoma *Willd.*
Ceratopteris thalictroides *Broug.*
Lygodium venustum *Swartz.*
L. volubile *Swartz.*
Schizæa pennula *Swartz.*
S. elegans *Swartz.*
Anemia Breuteliana *Presl.*
A. Phyllitidis *Swartz.*
Danæa alata *Smith.*
Danæa elliptica *Smith.*
D. nodosa *Smith.*
Equisetum giganteum *L.*
Psilotum triquetrum *Swartz.*
Lycopodium carolinianum *L.*
L. clavatum *L.*
L. cernuum *L.*
L. myrsinitis *Lam.*
L. aqualupianum *Spring.*
Selaginella serpens *Spring.*
S. producta *Baker.*
S. affinis (?) *A. Br.*
S. mnioides *A. Br.*
S. albonitens *Spreng.*
S. radiata *Baker.*

The Rhizocarps—*Marsilea*, *Salvinia* and *Azolla*—which grow on the surface of still water, have not been sent from Trinidad, but, no doubt, are found there. Several common West Indian ferns too, the absence of which one notes in this list, probably await discovery, with some less known species.

A LIST OF PLANTS OBSERVED IN S. DERBYSHIRE.

By the Rev. W. H. Purchas, L.Th.

(Continued from p. 44).

Prunus communis Huds. — †*P. domestica* L. An escape from cultivation at Calke Mill.

Spiræa Ulmaria L. About ditches at Calke.—*S. Filipendula* L. In very small quantity in one or two spots about Calke, and in one spot between Tickenhall and Hartshorne.

Rubus Idæus L. Thickets and banks.

R. plicatus W. & N. Bog at Repton Rocks. Probably correctly named, but as I unfortunately did not preserve a specimen from this station, I feel some degree of doubt as to whether it might not rather have been called *R. fissus*.

R. affinis W. & N., on Bloxam's authority. At White Lees, Tickenhall, and by the side of the Repton Road, Tickenhall; I think also at Repton Rocks.

R. Lindleianus Lees. Hedges and thickets.

R. rhamnifolius W. & N. Sometimes approaching the *cordifolius* form. In hedges.

R. thyrsoideus of Bloxam! and Wimm.? Near Stanton-by-Bridge. My specimens were verified by Mr. Bloxam as "good" *thyrsoideus*,

as understood by him. It is a different plant from anything which I have seen in the south-western counties, and answers much better to Prof. Babington's description of *R. thyrsoideus* Wimm. in the 'Journal of Botany' for July, 1886, p. 220, than to that in 'Brit. Rubi,' p. 109 (now *R. pubescens* Wirg.). Mr. Painter showed me a specimen of the same thing, which had, I think, been collected near Repton. It is a very marked bramble when seen growing, and is thinly scattered over the adjoining parts of Leicestershire.

R. rusticanus Merc. (*R. discolor* Bab.). Hedges and banks.

R. macroacanthus Bloxam. Between White Lees and Broadstone, Tickenhall, *teste Bloxam*.

R. leucostachys Sm. Hedges between Calke and the foot of Pistern Hill, and elsewhere. The petals are there of a deeper pink than in any other bramble known to me. In Herefordshire, where I first became acquainted with this species, the petals are usually white, especially in the wood forms, and hence until I went to live in Derbyshire Mr. Borrer's account of their colour in 'Eng. Bot. Suppl.' puzzled me. In N. Staffordshire also the petals are white, thus showing how little reliance can be placed on colour as a distinctive mark.

R. calvatus Blox.! Bank of the Ashby Road, over Pistern Hill; also at Dimminsdale, Calke. A fine distinct-looking bramble, which I have only seen in Derbyshire and Leicestershire. It was first pointed out to me by the Rev. W. H. Coleman, and my specimens were verified by Bloxam.

R. carpinifolius of Bloxam! (*R. macrophyllus* var. *umbrosus* of Babington). Roadside-banks between Calke and Melbourne, and elsewhere. Confirmed by Bloxam.

R. macrophyllus var. *amplificatus*. Either this or a form of *Schlectendalii* on the edge of a plantation at Melbourne. Mr. Bloxam hesitated between these two names.

R. Sprengelii and *R. Borreri* Bell Salt. Hedges between Calke and Melbourne, and near Southwood Farm. Probably most of the plants belong rather to the larger form *R. Borreri* than to the true *R. Sprengelii*.

R. Hystrix Weihe. Woody places.

R. rudis Weihe. Rather scarce.

R. Radula. Hedge-bank of the Ashby Road, on Pistern Hill. Confirmed by Bloxam. — Var. *Bloxamianus* Coleman. Under this name I intend a bramble which is not uncommon on the borders of Derbyshire and Leicestershire, and which was first pointed out to me by the Rev. W. H. Coleman as distinguished from *R. Radula* by the remarkably dense clothing of setæ on its barren stem, between which setæ and the prickles, which are moderate-sized and chiefly confined to the angles, there is very little gradation. The leaflets of this bramble are roundly-obovate-cuspidate, their toothing more patent, and the felting of their under surface much less dense and white than in ordinary *R. Radula*. The panicle also is more narrow and compact. Although most of my specimens were gathered near Calke, I have none which were collected actually within the borders of Derbyshire, but I have a

distinct recollection of having seen this bramble in the hedges between Tickenhall and Stanton-by-Bridge; Mr. Painter also, some two years ago, showed me a specimen of it, which I understood to have been gathered near Repton. This bramble was entered by the Rev. W. H. Coleman under the name of "*R. Bloxamianus*" in a 'Catalogue of the Flowering Plants and Ferns of Leicestershire,' drawn up by himself and published at Sheffield (*W. White*) in 1862 as an abstract of a more complete Flora of the county, which was intended, I think, to appear in connection with a general History of the County of Leicester, by the same publisher. Although certainly not the *R. fuscoater* of Bloxam's first Fasciculus, nor the plant which Mr. Bagnall has sent me from Bromsgrove Lickey, and which he says was confirmed by Mr. Bloxam, this bramble was most assuredly included in Mr. Bloxam's later idea of *R. fuscoater*; for in 1863 I gathered it under his guidance in Gallows Lane. Measham, near Ashby-de-la-Zouch, he having taken me there in order to show me his "*R. fuscoater*"; and when in 1876 I had the pleasure of receiving a visit from my venerable friend at this place, he confirmed this name for the Gallows Lane specimens as well as for those gathered nearer to Calke. The Rev. W. H. Coleman, to whom I showed the Gallows Lane specimens whilst still fresh, assured me that they were not the same thing as Bloxam's former *R. fuscoater*. Prof. Babington also, to whom I submitted one of them, refused to acknowledge it as having anything to do with his own *fuscoater*, and referred it to *R. Hystrix*. Coleman referred it rather to *R. Radula*. I am obliged to own that I have failed to gain any clear idea as to what is really *R. fuscoater* of the 'Rub. Germanici,' so widely different are the plants to which that name has been assigned by experts.

R. Kœhleri var. *pallidus* Bab. Woody places. Robust specimens from a bush in a plantation close to Calke Mill were referred by Mr. Bloxam to *R. Bloxamii*, but, notwithstanding his great authority, I must believe them to belong rather to the common and variable *R. pallidus*. I have again carefully compared them with authenticated *R. Bloxamii*, and cannot believe them to be the same thing; whilst on the other hand they differ but very slightly from what both Bloxam and Prof. Babington have recognised as *R. pallidus*.

R. nemorosus Bloxam (*R. dumetorum* of Warren, Journ. Bot. 1870). Common in hedgerows, and often approaching near to *R. corylifolius*; on the other hand passing insensibly into *R. tuberculatus*, which occurs near Calke, but less commonly than the more weakly armed form.

R. diversifolius Lind. An extreme form, *i. e.* Warren's var. *intensus* of *R. dumetorum*. Between Melbourne and Castle Donnington, but scarce.

R. corylifolius var. *sublustris*. Hedges about Smisby.—Var. *conjungens* Bab. Near Tickenhall.

R. deltoideus P. J. Müll.? (*R. althæifolius* Bab.). A form occurred at Broadstone, near Tickenhall, which probably comes under *R. althæifolius* of Babington.

R. cæsius L. I have not materials for enabling me to decide which varieties should be specified, but the species is not uncommon. This list of brambles is confessedly incomplete, and might be much extended if a diligent search were made. It so happened that the best bramble hunting-grounds near me lay within the borders of Leicestershire, and thus one or two species which were really met with are not available for the present list.

Geum urbanum L. Hedge-banks and woods.—Neither *G. rivale* nor *intermedium* seen in the district.

Fragaria vesca L. Woody places. At Heath End occurred a white-fruited variety in some plenty, scarcely to be distinguished from what I have seen grown in gardens as the "alpine strawberry."

Potentilla Fragariastrum L., *P. Tormentilla* Neck., *P. reptans* L., and *P. Anserina* L. All common.

Alchemilla vulgaris L. and *A. arvensis* L.

Agrimonia Eupatoria L.

Poterium Sanguisorba L. By the side of the tramway at Tickenhall, also sparingly at Calke.—*P. officinale* Hook. f. Meadows.

Rosa mollis Sm. At Heath End. Scarce and not very characteristic, but recognised by Mr. Baker as this species.—*R. tomentosa* Sm. Stanton-by-Bridge. "Characteristic *tomentosa*," *Baker*. Also a variety which tends towards *R. mollis*. The Scaddows, Tickenhall. — Var. *scabriuscula* Sm. Between Melbourne and Castle Donnington.—*R. canina*, a. *lutetiana*. Common. In the old coach road at Tickenhall I met with a bush with glandular sepals, which Mr. Baker referred to *R. malmundariensis* (see his 'Monograph,' p. 226). — e. *dumalis*. Between Calke and Southwood, *teste Baker*. —g. *urbica*. A somewhat hairy rose with broad leaflets found by me in hedges between "Stanley's Barn" and White Hollows was referred to var. *urbica* by Mr. Baker. — n. *tomentella*. Between Heath End and the foot of the Pistern Hill. "Exactly our Yorkshire *tomentella*," *Baker*. — s. *cæsia*. Heath End, near Calke. "Characteristic," *Baker*. Also formerly at Repton, but when I last sought for it the bush had disappeared. — *R. arvensis* Huds. Not uncommon in hedges and wood-borders.

Pyrus Malus L. Repton Rocks.

Cratægus Oxyacantha var. *monogyna* Jacq.

Saxifraga tridactylites L. Walls at Tickenhall.—*S. granulata* L. Near the Furnace Farm and the Wood Houses, Melbourne. Not common in the district.

Chrysosplenium oppositifolium L. Sides of ponds and streamlets, &c. — *C. alternifolium* L. As usual, much less common than the preceding. Milton and at Knowl Hills, near Ingleby.

†*Ribes Grossularia* L. Apparently an escape; neither of the other species of *Ribes* observed.

Cotyledon Umbilicus L. Found by Mr. Bloxam at Anker Church, near Repton! as recorded in N. B. G., p. 261, and on the Rev. Churchill Babington's authority, at p. 637.

†*Sedum reflexum* L. Old walls at Repton.

Drosera rotundifolia L. "Bog at Foremark Park," *Bloxam*! by which is doubtless intended the bog at Repton Rocks, which is

not far from the farm called "Foremark Park." The *Drosera* does not seem to have been found there of late years.

Hippuris vulgaris L. In small quantity in a pool near White Hollows, Tickenhall.

Myriophyllum spicatum L. Pond in Calke Park, *Bloxam*! — *M. verticillatum* L. Pond by Swarkestone Bridge, *Bloxam*!

Callitriche stagnalis Scop. Calke. I also find *C. verna* entered in my list, but as I am not sure that I was then acquainted with the true plant, I omit the name. About *C. stagnalis* I have no doubt.—*C. obtusangula* Le Gall. The specimen given by Bloxam as "*C. verna*" is, I think, undoubtedly this species. I have compared it with Messrs. Groves' Hampshire plants, and do not question their identity.

Lythrum Salicaria L. Side of the pond at Calke Mill. — *L. Hyssopifolia* L. A single plant only was found by the Rev. A. Bloxam! as recorded in N. B. G., p. 637. The spot, however, was not "in Calke Park," but on the site of a pond long since let dry and which was "two fields below the mill at Calke." Mr. Bloxam described the spot to me, and I searched it, but of course without surprise that a plant known to be so capricious and uncertain in its appearance was not again to be found there.

Epilobium hirsutum L., *E. parviflorum* Schreb., and *E. montanum* L. Common.—*E. roseum* Schreb. and *E. obscurum* Schreb. More rare.—*E. palustre* L. About the upper pond in Calke Park, and in the bog at Repton Rocks.

Circæa lutetiana L. Woody places.

Bryonia dioica L. Near Calke Abbey, *Bloxam*! No one else seems to have met with it there.

Hydrocotyle vulgaris L. Marshy places.

Sanicula europæa L. Woods and plantations.

Conium maculatum L. Between Milton and Foremark, also sparingly at Calke.

Apium nodiflorum Reich. Near Calke. — *A. inundatum* Reich. "Pond by Swarkestone Bridge," *Bloxam*!

Sium erectum Huds. (*S. angustifolium* L. "Near Calke Abbey," *Bloxam*! Not seen by me.

Ægopodium Podagraria L. Waste places.

Pimpinella Saxifraga L. Tickenhall Quarries. — *P. magna* L. Between Melbourne and King's Newton. Found also by *Bloxam*! in one spot at Calke.

Chærophyllum temulum L. Hedge-banks.

Scandix Pecten-veneris L. Sparingly found by *Bloxam*!

Anthriscus vulgaris Pers. Stanton-by-Bridge. Swarkestone, and sparingly at Tickenhall. — *A. sylvestris* Hoffm. Abundant.

Œnanthe fistulosa L. "Near Calke Abbey," *Bloxam*! — *Œ. fluviatilis* Colem. Mr. Bloxam's specimen marked "*Œ. Phellandrium*" from the Trent belongs to this, which was not then recognised as a species.

Æthusa Cynapium L. Waste ground,

Silaus pratensis Bess. Between Melbourne and Derby. I have no note of the exact station.

Angelica sylvestris L. Near Stanley's, Calke.
Heracleum Sphondylium L.
Daucus Carota L. Dry banks and pastures.
Caucalis Anthriscus Huds.
Hedera Helix L.
Cornus sanguinea L. Hedge between Calke and Springwood. Rather scarce in the district.

Adoxa Moschatellina L. "Between Tickenhall and Ingleby," *Bloxam*!

Sambucus nigra L.
Viburnum Opulus L. Woody places.
Lonicera Periclymenum L. Woods and hedges.
Galium Cruciata Scop. — *G. verum* L. — *G. Mollugo* L. Near Melbourne, on the road to Stanton-by-Bridge. — *G. saxatile* L. Heathy places. — *G. uliginosum* L. "Bog at Foremark Park," *Bloxam*! — *G. Aparine* L.
Asperula odorata L. Hedge-bank at Heath End.
Sherardia arvensis L.
Valeriana dioica L. Dimminsdale, Calke. — *V. sambucifolia* Auct. Angl. Woody places.
† *Valerianella olitoria* Mœnch. Stanton-by-Bridge; perhaps an escape, but well established. — *V. dentata* Poll. Fields "on the west side of Calke Park very abundantly," *Bloxam*! Also in a field near Archer's Pool, White Hollows.
Dipsacus sylvestris L. *Bloxam*! Not seen by me.
Scabiosa Succisa L. Calke Fields, rather scarce.—*S. arvensis* L. *Bloxam*!
Eupatorium cannabinum L. About some of the ponds at Calke.
Bellis perennis L.
Filago germanica L. Fields and dry banks.
Gnaphalium uliginosum L.
Pulicaria dysenterica Gaertn. Damp places by road-sides.
Bidens cernua L. Ponds at Calke. — *B. tripartita* L. "In a pond below the mill at Calke," *Bloxam*!
Achillæa Millefolium L.— *A. Ptarmica* L. Near Calke, *Bloxam*!
Anthemis Cotula L. Corn-fields.
Chrysanthemum segetum L. Milton.—*C. Leucanthemum*. Meadows and pastures.—† *C. Parthenium* Pers. On an old wall at Tickenhall.
Matricaria inodora L. and *M. Chamomilla* L. Fields.
Tanacetum vulgare L. Between Milton and Foremark; possibly an escape.
Tussilago Farfara L.
Petasites vulgaris Desf. Calke.
Senecio vulgaris L. Everywhere.—*S. sylvaticus* L. Melbourne, and at Repton Rocks. — *S. erucifolius* L. White Hollows, Tickenhall. Usually shows a preference for limestone, but there grows on the yellow Coal-measure clay soil. — *S. Jacobæa* L. and *S. aquaticus* Huds.
Carlina vulgaris L. Tickenhall Quarries.
Arctium minus Schk. Woods.
Carduus nutans L. — *C. crispus* var. *acanthoides*.

Cnicus lanceolatus Hoffm., *C. palustris* Hoffm., and *C. arvensis* Hoffm. All common.

Centaurea nigra L.—*C. Scabiosa* L. At the Tickenhall Quarries, *Bloxam* !

†*Cichorium Intybus* L. At the Dimminsdale Lime-yard, Calke, but evidently a casual.

Lapsana communis L.

(To be continued.)

THE FLORA OF BEDFORD PARK, CHISWICK.

By T. D. A. Cockerell.

Early in 1885 I began, on behalf of the Bedford Park Natural History Society, a list of the plants found within the Bedford Park district, including such parts of the parishes of Chiswick and Acton as are enclosed by the railway lines between Chiswick, South Acton, Acton Green and Turnham Green. The list is now, as regards the phanerogamic portion, nearly, if not quite complete, and as similar lists have already been published in this Journal from Kew Gardens and Kensington Gardens, this one, from a district intermediate between these two, may have some interest for comparison. The district was formerly a marshy one, and the plants existing at the present day may be roughly divided into (1.) Marsh-plants, survivals of the period prior to cultivation, becoming gradually scarcer. (2.) Weeds, incident on cultivation. (3.) Hedgerow plants, immigrants from the higher land about Acton and Ealing. (4.) Exotic aliens. (5.) British aliens.

In preparing the list I have been assisted by Mr. R. J. G. Read; Mr. Hamilton Jackson has collected many species of grasses new to the list, and most of the fungi were obtained during the past autumn by Miss A. S. Fenn and Mr. F. G. Fenn.

All the species of flowering-plants, about the identity of which there could be any doubt, have been most kindly examined and verified, either by Mr. J. G. Baker or Mr. G. Nicholson; while the fungi have been named by Dr. M. C. Cooke and Mr. G. Massee.

Ranunculus acris.
R. bulbosus.
R. repens.
R. arvensis.
R. Ficaria.
Papaver Rhœas.
P. Argemone. One plant.
Fumaria officinalis.
Capsella Bursa-pastoris.
Cochlearia officinalis. Casual.
C. Armoracia. Casual.
Senebiera Coronopus
Sisymbrium Alliaria.
S. officinale.
S. Sophia. Alien.
Brassica Sinapis.
Bunias orientale.
Erysimum cheiranthoides.
Nasturtium officinale.
Raphanus Raphanistrum.
Alyssum incanum. Casual.
Camelina sativa. Casual.
Lepidium Draba. Very abundant in a field in 1885.

Lepidium ruderale.
Diplotaxis muralis.
Barbarea vulgaris.
Thlaspi arvense. Casual.
Reseda Luteola. Very fine on the top of a wall by Turnham Green Station.
Viola tricolor *a*. typica.
Arenaria leptoclados. Wall by Turnham Green Station.
Stellaria media.
S. graminea.
Sagina nodosa. Acton Green, August, 1885.
Silene inflata.
Lychnis Flos-cuculi.
L. vespertina.
L. Githago.
Saponaria Vaccaria. Alien.
Hypericum quadrangulum.
H. pulchrum.
Malva sylvestris.
M. rotundifolia.
Linum usitatissimum. Casual, rather frequent.
Geranium dissectum.
G. molle.
G. rotundifolium. Has been found in Chiswick, though outside our district, by Mr. F. Sich, jun.
Erodium cicutarium. Casual.
Impatiens parviflora. Locally abundant.
Ulex europæus. Planted on the railway bank.
Cytisus scoparius. Planted on the railway bank.
Trifolium repens.
T. pratense.
T. hybridum.
T. procumbens.
T. incarnatum. Casual.
Lotus pilosus.
L. corniculatus.
Medicago lupulina.
Melilotus alba. Casual.
M. officinalis.
Vicia Cracca.
V. hirsuta.
V. sativa. Casual.
Lathyrus pratensis.
Prunus communis.
Spiræa Ulmaria.
Rubus rusticanus=discolor *Ang. auct.* Abundant in hedge-rows; three varieties occur:—*a*. Thorns straight, red except at tips, 9½ mill. long; leaves dark green above, 56 mill. long, 23½ broad; flowers pink. *b*. Thorns curved, green, very little if at all tinged with red, 6 mill. long; leaves dark green above, 55 mill. long, 28 broad; flowers pink. *c*. Thorns few, nearly straight, slightly red (distinctly so at base), length 3–3½ mill.; leaves bright green, more cut than *a* and *b*, 45 mill. long, 28 broad; flowers pale.
R. corylifolius. With the last, but less plentiful.
Geum urbanum.
Potentilla reptans.
P. Anserina.
P. recta. Casual.
Agrimonia Eupatoria.
Rosa canina *var.* dumalis.
Cratægus Oxyacantha.
Lythrum Salicaria.
Epilobium palustre.
E. montanum.
E. parviflorum.
E. hirsutum.
Circæa lutetiana.
Bryonia dioica.
Apium graveolens. Alien.
A. nodiflorum.
Anthriscus vulgaris.
A. sylvestris.
Æthusa Cynapium.
Heracleum Sphondylium.
Hedera Helix.
Sambucus nigra.
Galium Aparine.
G. palustre.
Dipsacus sylvestris.
Bellis perennis.
Erigeron canadense.
Gnaphalium uliginosum.

Pulicaria dysenterica.
Achillea Millefolium.
A. Ptarmica.
Chrysanthemum Leucanthemum
Matricaria inodora.
Artemisia vulgaris.
Tussilago Farfara.
Senecio vulgaris.
S. sylvaticus.
Arctium minus.
Cnicus lanceolatus.
C. arvensis.
Onopordon Acanthium.
Centaurea nigra.
Lapsana communis.
Crepis virens.
Hypochœris radicata.
Leontodon autumnalis.
Taraxacum officinalis *a.* dens-leonis.
Sonchus oleraceus.
S. asper.
S. arvensis.
Tragopogon pratensis.
Calystegia sepium.
Convolvulus arvensis.
Solanum Dulcamara.
S. nigrum.
Scrophularia aquatica.
Linaria vulgaris.
Veronica polita.
V. agrestis.
V. Buxbaumii.
V. Chamædrys.
Nepeta Glechoma.
Prunella vulgaris.
Stachys sylvatica.
S. annua. Casual.
Salvia verticillata. Casual.
Galeopsis Tetrahit. Casual.
Lamium purpureum. Abundant.
I found two forms growing in close proximity:—*a.* Flowers deep pinkish above, upper lip rounded at extremity; leaves heart-shaped. *b.* Flowers very pale pink above, upper lip squarish at extremity; leaves more pointed.
L. album.
Ballota nigra.
Anagallis arvensis.
Myosotis arvensis.
Plantago major.
P. lanceolata.
Chenopodium Bonus-henricus.
C. album.
C. polyspermum.
Atriplex hastata.
Fagopyrum esculentum. Alien.
Polygonum Convolvulus.
P. aviculare. Very variable. I have noticed three forms:—*a.* Ends of petals white; stem rather strong, slightly flattened; distance between the leaves about 16½ mill. long and 5½ broad. *b.* Ends of petals bright pink; distance between leaves 7½ mill.; leaves 8 mill. long and 3⅓ broad. *c.* Stem erect.
P. Persicaria.
P. lapathifolium.
P. amphibium *var.* terrestre.
Rumex obtusifolius.
R. Acetosa.
Euphorbia Helioscopia.
E. Peplus.
Ulmus campestris.
Humulus Lupulus. Alien.
Urtica dioica.
U. urens.
Cannabis sativa. Casual.
Corylus Avellana. Probably an alien.
Quercus Robur *a.* pedunculata. Common.
Salix fragilis (form *latifolia*). Common.
S. pentandra. Probably planted.
Arum maculatum (form *immaculatum*). Local.
Lemna minor.
Juncus bufonius.
J. effusus.
J. glaucus.
J. conglomeratus.
Poa annua.
P. trivialis.
Phalaris canariensis.
Holcus lanatus.

Phleum pratense.
Avena sativa.
A. elatior (= avenacea).
A. fatua.
Trisetum flavescens.
Briza media.
Triticum repens.
Panicum miliaceum.
P. crus-galli.
Setaria viridis.
Nardus stricta. On wall by Turnham Green Station.
Bromus asper.
B. arvensis.
B. mollis.
B. sterilis.
Lolium perenne.
L. italicum.
L. temulentum.
Agrostis vulgaris.
Dactylis glomerata.
Aira cæspitosa.
Hordeum murinum.
H. pratense,
Alopecurus pratensis.
A. geniculatus.
A. agrestis.
Anthoxanthum odoratum.
Calamagrostis Epigeios.
Cynosurus cristatus.
Festuca elatior.

On comparing the above with Mr. Nicholson's Kew Gardens' list (Journ. Bot. 1875, pp. 9, 42, 71). it will be noticed that it contains a smaller number of species, as might be expected from the smaller size and greater uniformity of the district, as well its being for the most part built over. Nevertheless there are several forms not included in the Kew list, as also many interesting aliens, which had no place in the ancient flora of the district, but are now taking the place of the native species, while the latter become scarcer every day.

I have included several plants which were undoubtedly introduced by human agency, because it is not easy in the present case to draw the line between these and natural immigrants, and also on account of the influence they have upon the fauna.

The Cryptogamia have not yet received any large share of attention, but I give the list as far as completed, some of the species being interesting.

Lastræa Filix-mas. The Orchard (alien), 1886.
Equisetum arvense.
Bryum argenteum.
Funaria hygrometrica.
Fissidens purpureus.
Hypnum sericeum.
Pellia epiphylla.
Agaricus (Lepiota) rachodes.
A. (Armillaria) melleus.
A. (Collybia) dryophilus.
A. (Collybia) muscigenus.
A. (Mycena) galericulatus.
A. (Pholiota) pudicus.
A. (Flammula) spumosus.
A. (Galera) hypnorum.
A. (Psaliota) campestris.
A. (Psaliota) æruginosus.
A. (Psaliota) semiglobatus.
A. (Stropharia) inunctus.
A. (Hypholoma) velutinus.
A. (Hypholoma) fascicularis.
A. (Psilocybe) fœnisecii.
A. (Psathyra) corrugis.
A. (Panæolus) phalenarum.
A. (Panæolus) papilionaceus.
Hygrophorus niveus.
Coprinus atramentarius.
C. comatus.
Marasmius oreades.
Polyporus versicolor.
Nectria cinnabarina.
Valsa leucostoma.
Trichobasis suaveolens.
Æcidium grossulariæ.
Monilia (Oidium) fructigena.

NEW OR RARE BRITISH AND IRISH MOSSES.

By Henry Boswell, M.A.

Some interesting species have recently been added to our Moss-list, and new localities found for several of the rare species, a few notes whereon will be of use as showing that there are still possibilities remaining to us of yet further discoveries within the limits of our own favoured islands.

Sphagnum acutifolium var. *fuscum* Schpr. Estuary of the Dovey, near Borth, in company with rushes and Carices; *H. B.* New to North Wales. — *S. acutifolium* var. *luridum* Hueb. Mourne Mountains; *Rev. H. W. Lett.* New to Ireland.

Dicranella curvata Hedw. Isle of Man; *Mr. Boyd.* New to the island.

Campylopus brevipilus Br. & Sch. Estuary of the Dovey, with Sphagna; *H. B.* — *C. adustus* De Not.? A remarkable looking moss found by the Rev. Augustin Ley in Jersey, growing on granite rocks in company with *C. introflexus*, is probably this species; it agrees with the description very well, as far as it goes. The leaves have a short bristle-point, but the areolation differs altogether from that of our three familiar species, *atrovirens*, *brevipilus*, and *introflexus*, rather approaching that of *flexuosus*. I have been unable to obtain a specimen of the Italian moss to compare, but if not identical with that, the present would seem new altogether.

Tortula canescens Br., doubtfully recorded in 'Bryol. Brit.' as found on chalk cliffs in Sussex, and long unconfirmed as a native, has lately been found in East Cornwall by Mr. Ley, growing not upon chalk, but an old turfy wall and bank. It seems to be ripe two or three months earlier than *T. muralis*, and is a much more delicate plant, with a shorter fruit-stalk.

Grimmia elatior Schpr. Mourne Mountains; *Rev. H. W. Lett.* New to Ireland. Larger than *G. Schultzii*; leaves rather longer, with a smoother bristle. — *G. commutata* Hueb. Rocks near Rydal, Water; *Mr. Binstead.* — *G. Stirtoni* Schpr. Near Windermere; *Mr. Binstead.* New Galloway; *Mr. MacAndrew.* This appears a very distinct species. — *G. anomala* Hampe. Near Windermere; *Mr. Binstead.* Somewhat like *G. Hartmanni*, but may be distinguished by the more erect habit of growth, straighter stems, and shorter leaves, with rectangular-hexagonal, not sinuous, cells in the lower part.

Zygodon viridissimus, β. *rupestris* Lindb.—*Z. Stirtoni* Schpr. MS. The moss so called is not very well known to me, but a form that I have lately found upon an old wall near Oxford appears to be referable to it. In appearance it is a good deal more robust than the usual *Z. viridissimus* found upon trees, with leaves remarkably obtuse, apiculate by the excurrent nerve, which last feature distinguishes it from the New Zealand *Z. obtusifolius*, to which it might otherwise be compared. Under the microscope the two look almost like distinct species, but specimens from Derbyshire seem

almost exactly intermediate between the two and form a connecting link. Probably *Z. viridissimus* is a more variable plant than has been generally supposed.

Orthodontium gracile Wils. Ayrshire; *Mr. Boyd*. New to Scotland, I believe.

Bryum provinciale Phil. Near Wells, Somerset; *Mr. Binstead*. New to the peninsular province.—*B. fallax* Milde has been reported from Sussex, but specimens so-called that I have seen pertain to *B. intermedium*. — *B. obtusifolium* Lindb. (Jæger, Adumbratio, No. 146). Ayrshire, on the sea-shore; *Mr. Boyd*. A remarkable addition to our flora which I have lately received from its fortunate finder, and happened to be able to identify by comparison with Norwegian specimens after some little puzzling. It is barren and a mere morsel, but the characters are so distinct and peculiar that there is not much room for error. The leaves are oval-oblong, very obtuse, concave, soft of texture, with large cells, unbordered, and a short nerve distinctly ceasing below the apex. To what British species it comes nearest is less easy to decide; *B. Marrattii* has leaves of somewhat similar form, but is much smaller altogether than this plant, which in size of foliage more resembles *B. Neodamense*; that, however, has leaves bordered with a band of narrow cells.

Mnium affine var. *rugicum*. Specimens with strongly crisped leaves apparently belonging to this have been gathered in Aberdeenshire by Mr. Ewing, which recall Wilson's remarks, 'Bryol. Brit.,' p. 253.—*M. cinclidioides* Blytt. Ayrshire; *Mr. Boyd*. New to the West Lowland Province.

Anomodon longifolius Schleich. Near Wells; *Mr. Binstead*. Growing with *A. viticulosus*.

Eurhynchium abbreviatum Schpr. Mr. Ley finds this moss to be rather frequent in south-west Herefordshire, extending also into Monmouthshire on the one side and Shropshire on the other, fruiting not very rarely. Its places of growth are the sandy banks of the shady lanes so frequent in that part of the country, and, so far as yet known, it appears to shun calcareous soils. The great resemblance it bears to the denser forms or states of *E. Swartzii* (*pralongum* Schimper, not Dillenius) may have caused it to be overlooked for that plant, to which I was at first rather inclined to refer it; but it may be distinguished by the closer more tufted habit, the short erect branches, the leaves closer set together, erecto-patent, not widely spreading, as in *Swartzii*; and, when present, the shorter fruit-stalk. In other words, it differs from *E. Swartzii* in exactly the opposite direction to *E. hians* (Hedw.), found in Cornwall and Sussex. It is right to mention that, had not Mr. Ley somewhat persistently urged me to further examination, I should probably have let it pass as *E. Swartzii*.

Rhynchostegium currisetum (Brid.) may perhaps eventually prove not less frequent than *E. Teesdalii*, with which it might easily be confounded. Mr. Ley sends it from Herefordshire, Mr. Binstead from Somerset, and the Rev. H. P. Reader from Gloucestershire.

Hypnum callichroum Brid. and *Hylocomium umbratum* Schreb. have both been found in Westmoreland by Mr. Binstead.

NOTES ON PONDWEEDS.

By Alfred Fryer.

4. *Potamogeton Zizii* Roth.—Stem stout, much branched at the base, *rootstock producing numerous permanently submerged barren branches*; fruiting branches ultimately ascending to the surface, with many *lateral branches starting at acute angles*, and with *terminal coriaceous floating leaves on the flowerless as well as on the flowering shoots*. Lower leaves submerged, alternate, translucent, undulate, and finely denticulate towards the tip, sessile or shortly stalked, often longitudinally folded and recurved, or flat and ascending, narrowed towards the base, and narrow in proportion to their length; elliptical to lanceolate, or oblong-ovate, acuminate or mucronate, lowest sometimes reduced to a midrib. Upper leaves alternate or opposite, more distinctly stalked; uppermost floating, *coriaceous or subcoriaceous*, flat, entire; or membranous, very long-stalked; petiole $\frac{1}{2}$–3 in.; lamina 1–5 in., slightly decurrent, narrowed into the petiole, which is of the same substance and colour as the midrib, suddenly contracted towards the tip, which has the edges slightly involute when dry, forming a blunt point. Stipules blunt; lower small, clasping; upper large, free above, herbaceous, rarely subscarious, two-keeled or two-winged on the back, uppermost often cymbiform. Peduncles longer than the leaves at their base, often produced in clusters, stout, thickened upwards, 3–5 in. long. Spike dense, cylindrical, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long. Drupelets small in proportion to the size of the plant, laterally compressed, with a *prominent sometimes winged keel, and prominent lateral ridges; beak* short, *forming a continuation of the straight upper margin*. Colour of the whole plant *dark green* or green, in deep water sometimes yellowish olive-green.

The above description is made unusually full and comprehensive, so as to include all the fenland plants that are at present ranked as forms of *P. Zizii*, but some of which may ultimately prove to be sufficiently distinct for specific segregation. One of these forms, the *P. coriaceus* of *Nolte*, is probably the typical or central form of the *lucens* group as represented in Britain; but as the plant is little known at present I must reserve its life-history and the alliances of the whole group for some future note.

In the absence of its characteristic *long-stalked* floating leaves *P. Zizii* may be distinguished from *P. lucens* by its habit of growth, many barren submerged branches being produced, and many of the lower branches on the fruiting shoots remaining deeply submerged even at the time of flowering. The side branchlets, too, of the flowering branches usually start at acute angles, instead of at right angles as in *P. lucens*, giving quite a different look to the plants when growing. Exceptions do occur, as occasionally we meet with branches of *P. Zizii*, produced late in summer, in which the branchlets spring at right angles; but to notice all the exceptions to the already comprehensive diagnosis above given of this species would make this note of undue length, and only tend to obscure

rather than elucidate the real differences between *P. Zizii* and the plants nearly allied to it.

From *P. heterophyllus*, which it closely resembles in habit of growth, it may usually be distinguished by its larger size, and by the coriaceous floating leaves being less thick and being more gradually attenuated into the petiole. The drupelets are larger than those of *P. heterophyllus*, and smaller than those of *P. lucens*; in shape they usually resemble fruit of the former species, but some deep-water forms of *P. Zizii* produce fruit very like that of typical *lucens*. Apart from degrees of maturity, the fruit of *P. Zizii* is too variable to admit of exact description, a fact which perhaps indicates the need of further specific division.

Closely as this species resembles *P. lucens* on the one hand, and *P. heterophyllus* on the other, and closely as the three species follow one another in their many variations, they never seem actually to touch at any point, nor to produce intermediate forms which cannot be definitely assigned to one or other of the three species, if *the whole of the plant can be examined in a mature state*. Fragments or immature states of some of the forms of each are undoubtedly misleading, and the presence of such imperfect examples has led to much of the cross-naming noticeable in herbaria.

The local distribution in the fens of the species of this group certainly favours the idea of their specific distinctness, and weighs heavily against regarding them as merely local forms or as hybrids. In fact, the absence from a locality of one or two of the three species does not diminish, nor does the presence of all of them add to, the variability of any one of them, as far as my personal observations go.

It has been supposed that *P. Zizii* has two permanent forms, "one with floating leaves, and one without them": these "forms" are probably mere *states* dependent on local conditions. The coriaceous floating leaves are produced in both deep and shallow water, though more frequently in the latter: probably mere depth of water has less influence on their production than a sufficiently high temperature, since they are generally more abundant in warm summers; and probably are only more freely produced in shallow waters because such are more quickly heated up to the necessary temperature. In nearly dried-up waters all the leaves, lower as well as upper, become much thickened in texture, and the truly floating leaves often completely cover the surface, being then abundantly produced on the barren as well as on the fruiting branches. Their thickened substance enables the leaves to sustain the direct rays of the sun, and the dense covering of foliage hinders the evaporation of the already wasting pools. In the warm black soil of the fens the stagnant ditches and larger drains are certainly much more easily heated by the sun's rays than upland rivers and brooks, or than the artificial embanked rivers of the fens themselves; hence, perhaps, it is that *P. Zizii* exclusively inhabits the stagnant drains, and is absent from the waters of the uplands in and around the fens and from the embanked rivers. We have no form of this species which does not produce coriaceous leaves in warm seasons, and one

can hardly doubt that plants of *P. Zizii* from northern localities, where such leaves are seldom or never produced, would speedily develop them if transplanted to the warm fenland ditches. I should be thankful to correspondents who would enable me to make the necessary experiments to set this interesting question at rest, and would gladly undertake to grow any plants that may be sent to me.

SYNOPSIS OF *TILLANDSIEÆ*.

By J. G. Baker, F.R.S., F.L.S.

(Continued from p. 55.)

3. C. Osyana E. Morren in Belg. Hort. 1865, 254, t. 16-17.—Acaulescent. Leaves about 30 in a rosette, lanceolate, pale green, above a foot long, 1½ in. broad at the middle, narrowed gradually to the point. Peduncle very short. Flowers in a dense globose head 3–4 in. in diameter; bracts scarlet, ovate, acute, squarrose, the outer 1½–2 in. long. Calyx-segments oblong, obtuse, involute. Corolla bright yellow, twice as long as the calyx; segments oblong, obtuse, much shorter than the tube. Stamens half as long as the corolla-segments; filaments short, flattened; anthers small, linear-oblong.

Hab. Ecuador, discovered by Wallis in 1875. Flowered in cultivation, in 1885, by M. Jacob-Makoy & Co., of Liege, and exhibited at Antwerp.

4. C. coriostachya Griseb. in Gotting. Nachtrage, 1864, 21.—Leaves lanceolate, acute, 1½– ft. long. Peduncle as long as the leaves. Spike dense, oblong, 4 in. long; bracts round-deltoid, coriaceous, 8–10 lines broad. Calyx as long as the corolla-tube; segments oblong, obtuse. Corolla-tube clavate; segments oblong, obtuse, half as long as the tube. Anthers oblong, the alternate ones longer than the filament.

Hab. Mountains of Venezuela, alt. 4000 ft., *Fendler* 2167.

5. C. Furstenbergiana Kirch. et Wittm. in Berlin Gartenzeit. 1883, 299, with a coloured figure.—Acaulescent. Leaves about 15 in a rosette, lanceolate, 12–16 in. long, without spots or stripes. Peduncle much shorter than the leaves; its bract-leaves numerous, short, ascending, lower green, upper bright red. Inflorescence a short simple spike; bracts ovate, acute, red. Calyx ventricose; segments lanceolate. Corolla whitish, 1¼ in. long; segments much shorter than the tube. Stamens much shorter than the corolla-segments; filaments very short, flat.

Hab. Andes of Ecuador, discovered by Roezl. Flowered in the collection of Prince Furstenberg at Donauschingen in 1883.

6. C. Berteroniana R. & S. Syst. Veg. vii. 1229. *Devillea speciosa* Bertero MSS. — Leaves lanceolate-acuminate, quite glabrous, 12–16 in. long, 1½ in. broad above the base. Peduncle as long as the leaves; bract-leaves many, lanceolate, erect.

Flowers in a simple erect cylindrical spike 6–8 in. long, not dense, each placed in the axil of an ovate-lanceolate acute bract 2–2½ in. long, ¾ in. broad. Calyx ¾ in. long; sepals oblong, obtuse. Corolla yellow, 2–2¼ in, long; tube subcylindrical; segments oblong, obtuse, half as long as the tube. Stamens shorter than the corolla segments.

Hab. Mountain woods of Porto Rico, *Bertero*.

7. C. Peacockii E. Morren in Belg. Hort. 1885, 82. — Tuft of leaves 2½ ft. diam. Leaves rose-purple, bronzed on the upper surface, and marked with transverse bars of white towards the clasping base. Peduncle covered with bright red bract-leaves; upper crowded round the densely spicate flowers; flower-bracts tipped with white.

Hab. Country unknown. Sent by Mr. J. T. Peacock, of Hammersmith, to Prof. Morren, about 1873.

8. C. Andreana E. Morren in Ber. Hort. 1884, 247, with woodcut; 1886, 276, with coloured plate. — Leaves 20–30 in a rosette, lanceolate, plain green, 1½–2 ft. long, narrowed to the point. Peduncle 1½ ft. long. Panicle lax, shorter than the peduncle; axis bright red; spikes short, dense; branch-bracts small, red, ovate, acute. Calyx bright yellow, half as long as the corolla. Corolla bright yellow, above 2 in. long; segments oblong, obtuse, falcate, much shorter than the cylindrical tube. Stamens shorter than the corolla-segments.

Hab. New Granada; Cordillera of Pasto. Discovered by M. André in 1876, and introduced by him into cultivation.

9. C. Vanvolxemi André in Ill. Hort. n. s. t. 326. — Leaves 20–30 in a dense rosette, lanceolate, acute, spreading, plain green on both sides, 2–2½ ft. long, 2–2½ in. broad at the middle. Peduncle overtopping the leaves; bract-leaves erect, lanceolate, green, much imbricated. Inflorescence a narrow dense panicle; branch-bracts bright red, ovate-acuminate; spikes dense, short, erecto-patent, multifarious; flower-bracts ovate, obtuse, red or yellow, shorter than the calyx. Calyx-segments oblong, obtuse. Corolla yellowish white, little longer than the calyx.

Hab. New Granada; Mount Quindio, alt. 8000–10,000 ft. Discovered by M. André in 1876, and introduced by him into cultivation.

10. C. Zahnii Hook. fil. in Bot. Mag. t. 6059. — Leaves 20–30 in a rosette, lanceolate, thin in texture, falcate, 12–15 in. long, 1–1¼ in. broad at the middle, 2 in. at the dilated base, narrowed gradually to an acute point, not perceptibly lepidote on either surface, often tinged with red, striped on both sides with fine vertical lines of red-brown. Peduncle about as long as the leaves; bracts many, lanceolate, erect, the upper bright red. Panicle dense, 3–4 in. long; branches 3–4, short, erecto-patent; branch-bracts ovate-acuminate, yellow, tipped with red; flower-bracts ovate, acute, yellow, as long as the calyx. Sepals imbricated, pale yellow. Corolla about an inch long, yellow; segments oblong, obtuse, spreading, much shorter than the tube. Stamens shorter than the corolla-segments.

Hab. Chiriqui, *Zahn*. Discovered in 1870. Introduced into cultivation by Messrs. Veitch.

11. C.? Augustæ Benth. Gen. Plant. iii. 668. *Encholirion Augustæ* R. Schomb. in Bot. Zeit. 1846, col. 454; Verhand. Preuss. Garten. 18, t. 2; Beer, Brom. 27; Belg. Hort. 1883, 193.—Leaves under a foot long, linear from a broad clasping base, rigid in texture, ½ in. broad at the base, margined downward with minute deltoid prickles. Peduncle a foot long; bract-leaves numerous, erect, linear-subulate, from a broad clasping base. Panicle dense, 3–4 in. long, composed of about a dozen short congested erecto-patent spikes, overtopped by the large ovate-acuminate navicular branch-bracts, the lowest of which is 2 in. long. Calyx ½ in. long; sepals oblong, obtuse, pubescent, free to the base. Corolla with a cylindrical tube as long as the calyx, and 3 orbicular dark purple segments as long as the tube. Stamens shorter than the corolla-segments. Ovary immersed at the base.

Hab. British Guiana, on Mount Roraima, *Robt. Schomburgk* 687, *Richd. Schomburgk* 1021! I have no doubt this will prove generically distinct from *Caraguata*; but at present the fruit is unknown, so I leave it where Mr. Bentham has placed it. Probably it does not belong to *Tillandsieæ* at all.

12. C. (Massangea) musaica André in Ill. Hort. 1877, 27, t. 268; Baker in Bot. Mag. t. 6675. *Massangea musaica* E. Morren in Belg. Hort. 1877, 50, 199, t. 8–9. — Leaves 15–20 in a sessile rosette, lorate, rather horny in texture, obtuse at the apex with a deltoid cusp, abruptly falcate, 1½–2 ft. long, 2–3 in. broad, banded copiously in the back with transverse fine vermiform lines of red-brown on a purple-tinted green ground. Peduncle about a foot long; bract-leaves small down to the very base, bright red, deltoid, scariose. Flowers about 20, aggregated in a globose head; bracts deltoid, red, about an inch long. Calyx horny, orange, with a white tip, 1–1¼ in. long; segments lanceolate. Corolla shorter than the calyx, white; segments oblong, as long as the tube. Stamens shorter than the corolla-segments; filaments very short

Hab. New Granada; Province of Ocana, alt. 3000 ft.; discovered by Wallis in 1857. Was spread widely in gardens before it flowered, under the names of *Billbergia*, *Tillandsia*, and *Vriesea musaica*.

3. Schlumbergeria E. Morren.

Sepals erect, imbricated, shortly connate at the base. *Corolla* gamopetalous; tube cylindrical; segments lingutate. *Stamens* inserted at the throat of the corolla-tube; filaments slender, longer than the free anthers. *Pistil*, *capsule*, and *seeds* as in *Caraguata* and *Tillandsia*.—Acaulescent, with leaves in a dense rosette. Inflorescence copiously panicled. Very near *Caraguata*, from which it differs mainly by its longer corolla-segments and longer spreading slender filaments.

Leaves plain green	**Sp. 1.**
Leaves with copious slender brown transverse lines .	**Sp. 2–3.**

1. S. VIRESCENS E. Morren, Belg. Hort. 1879, 225, 360, t. 19. *S. Roezlii* E. Morren, Belg. Hort. 1878, 311; Antoine in Oester. Bot. Zeitsch. 1882, 277, with figure. *Puya virescens* Hook. in Bot. Mag. t. 4991. *Pitcairnia virescens* K. Koch, Monogr. 4; Baker in Journ. Bot. 1881, 304.—Acaulescent; tuft about a yard in diameter. Leaves 40–50, lorate, 1½–2 ft. long, 1½ in. broad, deltoid, cuspidate at the apex, plain green or spotted and striated at the base with red-brown. Peduncle slender, about as long as the leaves; bracts small, distant, adpressed to the stem. Panicle with 2–4 lax erecto-patent branches, 6–10 in. long, 4–5 in. broad when expanded; flower-bracts ovate, green, shorter than the calyx; pedicel stout, very short. Calyx under an inch long, green, smooth; sepals oblanceolate-oblong, shortly united at the base. Corolla greenish white, much longer than the calyx; tube ampullæform; segments oblong, obtuse, ⅓–½ in. long. Stamens rather shorter than the corolla-segments; filaments filiform, spreading, longer than the anthers.

Hab. Andes of Peru, alt. 10,000–13,000 ft., *Roezl.* 105, 106. We had it at Kew in 1857, but never knew its exact locality.

(To be continued.)

SHORT NOTES.

THE NEW RUBUS (p. 82). — I am sorry to find that the name (*lucens*) proposed for this is preoccupied, having been bestowed by Focke upon a Himalayan species. I propose therefore to substitute *lætus* for it.—E. F. LINTON.

FLORA OF NORTH DEVON. — *Sibthorpia europæa* L., which in last month's Journal, *ante*, p. 85, was reported by Mr. David Fry from the parish of Lynton, occurs in quantity in the parish of Countisbury, in the valley of the same East Lyn river or by the little tributary streams, where I gathered it both in last year and the previous one. It was also noticed many years ago between Bideford and Clovelly by the late Rev. W. S. Hore. The flora of this vice-county is being examined and carefully recorded by a special committee of the Barnstaple Literary and Scientific Institution, of which Mr. Thomas Wainwright, Head Master of the Grammar School at Barnstaple, is Honorary Secretary. Either he or I would appreciate any assistance from Mr. Fry or other botanist who may explore or visit the district.—W. P. HIERN.

JAMAICA MOSSES (note to p. 50). — One more species new to the island may be added to those lately recorded. In separating a dense tuft or lump of *Bartramia tomentosa* I find intermixed therewith a few stems of the familiar *Hypnum cuspidatum*, which differ in no respect from the ordinary states of the British plant, except in being rather slender and attenuated, a condition easily accounted for by their situation. They are without flowers of either kind, and only interesting as showing that this common European and North American species extends to Jamaica.—H. BOSWELL.

NOTICES OF BOOKS.

British Orchids. By A. D. Webster. Bangor: Nixon & Jarvis. Pp. 103. Illustrated. Price 2*s.* 6*d.*

One of the objects of the author in publishing this book has been, he tells us, to give suggestions for cultivating the British Orchids; and he seems to have been successful both in obtaining living plants of most of the English species and in growing them satisfactorily. Terrestrial orchids, however, are generally so difficult of cultivation, and, especially among the *Ophrydeæ*, so given to suddenly disappearing, that they have never been very popular with gardeners, lovely as they often are. This work, however, ought to induce lovers of this group of plants to try again to acclimatise them far from their native haunts.

Each species is described, and its treatment in the garden discussed, in most cases with considerable accuracy. Perhaps the most unsatisfactory part is that which relates to *Orchis maculata* and *latifolia*. The author here, in describing the well-known *O. maculata superba*, says "that it is a sport or hybrid between these two plants (*O. maculata* and *latifolia*) is admitted by all." We do not see how it can be a sport and a hybrid at the same time, but as a matter of fact it is quite manifest that the true plant is not at all connected with *O. latifolia*, but a well-marked variety of *O. maculata*. Mr. Webster then describes a new variety, *O. maculata præcox*, which, as far as we can make out, differs only in smaller size, slightly earlier flowering-period, difference of the soil and situation in which it grows, and some very slight differences in the proportions of the leaves and middle lobe of the lip. On these grounds the author desired to distinguish this plant as a new species, but on the recommendation of Prof. Dickson reduces it here to a variety only. We have not seen type-specimens of the plant, but can guess pretty clearly what it is, namely, the common heath form of *O. maculata*, almost the only form of the plant that one meets with in the dry heaths and moorlands of Wales and Ireland, and very commonly in the heath-country of the South of England. To one whose district only furnishes this plant and the tall swamp-loving form, the *O. recurva* Nym., which is usually reckoned the typical *O. maculata*, it might appear that the two plants were quite distinct, but in districts where the spotted orchis is really abundant he would find innumerable varieties connecting the two forms. After so carefully distinguishing this plant, it will surprise the reader to find *Orchis incarnata* entirely ignored, the name being simply given as a synonym of *O. latifolia*. This plant would be, especially if the magnificent form from Southport sand-hills were taken, a grand addition to the garden. We should like, too, to have seen some mention of *O. mascula speciosa*, a plant well worthy of cultivation, and cannot agree that *Habenaria chlorantha* is only a form of *H. bifolia*, or that *O. simia* is but a variety of *O. militaris*. The author, by the way, describes the lip of *O. simia* as crimson; is this ever so? In the only living specimens we have seen and in all the figures published it is purplish grey, or the most exquisite violet.

The author is apparently much puzzled by the difference between *Orchis maculata* and *O. latifolia*, but suggests a simple and practical solution of this vexed question of nomenclature, *viz.*, that the name *latifolia* be only applied to the plant having unspotted leaves, and consequently deep purple or port-wine flowers; and that "all specimens with spotted leaves and variously coloured (usually lighter) flowers be regarded as mere hybrid forms between this plant and *O. maculata*"! That Mr. Webster has not kept himself quite *au courant* with the progress of English Botany is evident by his stating that *Epipogum* has not been found again since its first discovery as a British plant at Tedstone Delamere: readers of this Journal will remember it has occurred at least three times in quite a different locality since.

With respect to the illustrations, it would have been better to have given some clue to their proportions to the size of the plant, some being larger than life-size and some smaller; and we regret to see an unrecognisable figure of *Liparis Loeselii* reproduced, in which the flowers look more like those of an *Ophrys* than anything else. These details could easily be altered in a new edition, and we hope that Mr. Webster will not only further experiment in the cultivation of the British Orchids, but will try what can be done with other European species, of which there are so many exquisite ones almost unknown to the gardening public.

H. N. R.

Text-book of British Fungi. By W. De Lisle Hay, F.R.G.S. Swan Sonnenschein, Lowrey & Co.

This is one of the most curious books we have seen for a long time: it is in no sense what it purports to be, *viz.*, a Text-book of British Fungi, and as regards the advertised "100 plates and figures" there are but 64 "plates" in the work, and these "plates" are only a curious patchwork production, consisting entirely of little reprinted cuts from Cooke's 'Handbook of British Fungi.' It is needless to say that these small and old cuts are now quite out of date and next to valueless; they are indeed quite valueless in the book before us, for several well-known errors have not been corrected, and some of the cuts are printed upside down. Only illustrations of a few of the larger fungi are referred to in the letter-press, and all illustrations of the minor fungi are entirely ignored. Only the larger fungi are indexed, and these not under the old and extremely familiar Latin names, but under newly-invented "popular" names. The index is really nothing less than a satire upon popular names, for we have in it the "Wrinkletwig," the "Jellysprout," the "Thimblefinger," and the "Rootingshank." One almost fancies he is reading Dickens, and looks down the index expecting to see the "Turveydrop," the "Pumblechook" and the "Chuzzlewit," or perhaps Lewis Carroll's "Jabberwock." One can imagine the effect these names would have at a "Fungus Foray," or rather "Fungus Farce," where one amateur would point out the "Black Bulgar," another the "Conch," a third the "Guiltysprout," a fourth the "Striped Stump-flap," and so on for about 250 names.

The book treats of the General Features, Discrimination, Economic Use, Structural Anatomy, and Classification of Fungi. The classification of Fries, however, is departed from, and this causes great confusion, for no departure from Fries is at present necessary. The "plates" at the end of the volume are, moreover, provokingly arranged according to the scheme of Fries. There is a chapter on the Chemistry and Toxicology of Fungi, a Calendar of Fungi, and an explanation of mycological terms. The most important part of the book is the list of Edible and Poisonous Fungi, with recipes for cooking. Part of this is no doubt valuable, but species are given that are not "British," and amongst the "edible" species many highly poisonous plants appear. Amongst the latter *Lactarius controversus* is said to be "much eaten in France"; *L. piperatus*, "much eaten on the Continent"; *L. torminosus* "seems to be eaten in France and Russia," &c. In a raw state, a piece the size of a pea of either of the three fungi above-mentioned, if placed on the tongue, would cause intolerable agony. Possibly if well cooked some of the poisonous principles might vanish, but we question whether such species should be mentioned amongst esculents in a popular book, simply because a wild "Russian" could eat some of the plants mentioned, possibly to the accompaniment of a draught of rancid train-oil. Some of the so-called esculents are tough subjects, as *Polyporus squamosus* and *P. fomentarius*; we venture to say that if anyone should succeed in getting a slice of the first into his inside it would be a matter of surprise to his friends if he ever got a slice of anything else in. *P. fomentarius* looks like, and is as hard as, Honduras mahogany; a Russian might tackle a thin slice in very hard times, and no doubt he would feel quite a different person after the consumption.

From the hard fungi we may hastily pass on to the soft. Everyone who has walked in a wood in autumn must have noticed nasty, quivering, shaking lumps of fungoid jelly, hanging from dead, cankered and festered stumps and branches. One of these fungi, *Tremella fimbriata*, a purple-black mass of filth, although said to be "tasteless," is also said to be used "abroad" to colour and thicken soup. The word "abroad" is rather vague for these exact times, and for that matter so is the word "soup"; we fancy that even Bumble's "porochial paupers" would look on such doctored "soup" with a suspicious eye. *Tremella moriformis*, it seems, is also an esculent, although it is confessedly "difficult to do anything with these Tremellas, except add them to soup." Although in past times we have eaten many fungi, we now, at the close of our career, prefer our soup without the slobbery, shivering Tremellas. Many other hard, nasty and repulsive fungi are given by Mr. Hay amongst the esculents, as *Bulgaria inquinans*, largely eaten, it seems, "abroad,"—but "at times, when it was plentiful and other food (!) scarce." *Verpa digitaliformis*, which is said by Mr. Hay to grow on "shady sites," really always grows where human ordure has lain,—a very "shady" site, one would think, for an object of food, to an epicure fond of the good things of the table.

The list of Esculents is followed by a list of Poisonous Fungi. Here the author is on safe ground; we are willing to admit that his species are "all poisonous."

One hundred and thirty-three culinary recipes are given, but as the fungi are mentioned under the new popular names, the mycological mind becomes seriously fogged in their perusal; for instance, we are told how "To prepare Urchins," "To pickle Redmilks," "Blushers à la Barigoule," "To prepare Paxils," "To prepare Spindleshanks," "To prepare Lorchels," "Oaktongne à la Druidesse," &c. The constant necessity for reference to the popular index becomes very irritating, and in this process the danger of a mistake becomes intensified.

Although the book before us is, as we have shown, not without its shortcomings, yet there is a great deal of original matter in it well worth perusal by any unprejudiced reader. The "100 plates and figures" is the most annoying part of the book, and for this part the author is probably not responsible.

W. G. S.

Botanikens historia; i öfversigt af B. Högrell. Göteborg (Bolinder), 1886. 8vo, pp. viii. 304.

This historical survey of Botany belongs to the class of books which includes Sachs's 'Geschichte der Botanik' and Hoefer's 'Histoire de la Botanique.' Although written in Swedish, a language not much studied in this country, the book before us is commended to our readers on account of the care which Pastor Högrell has taken to give a notice of every writer known to him; consequently the list of authors, especially British authors, is much more extensive than those cited by the French and German writers above mentioned. The preface acknowledges assistance from various friends in Scandinavia and abroad, who have supplied particulars in answer to the author's request. Ancient Botany is considered to embrace the period of B.C. 330 with Aristotle, to A.D. 1530, Hermolaus Barbarus and Leonicenus closing this list. Modern Botany thence begins, the first period being from 1530 to 1737, Cæsalpinus to the first edition of Linnæus's 'Systema,' with sections 1530–1603, 1603–1671, and 1671–1735. The second period includes the whole of botanical progress from 1735 to 1885. The author treats his subjects to some extent geographically, grouping the several nationalities by themselves within each period. Following these, we find sections devoted to the history of morphology, anatomy and physiology, and then of special orders, succeeded by succinct sketches of systems of arrangement. Travels are next touched upon, and the book ends with notices of those who have appreciably advanced our knowledge of plants.

The book can be recommended as giving in a condensed form an immense amount of recent information which no other work affords.

B. D. J.

The last (Feb.) part of the 'Icones Plantarum' contains descriptions of the two new genera: *Chlorocyathus* Oliv. (Asclepiadeæ Periploceæ); *Brachylophon* Oliv. (Malpighiaceæ Banisterieæ). A species of *Cheilotheca* (*C. malayana*) is described from the MSS. of the Rev. B. Scortechini, "who, after devoting two years indefatigably to the exploration of the Flora of Perak, has within the last few months fallen a victim to its climate." We hope to publish later a detailed notice of Father Scortechini, as well as two papers on Malayan Ferns which he had prepared for this Journal.

Messrs. Oliver & Boyd (Edinburgh) send us yet another series of volumes on Forestry which Dr. Croumbie Brown is issuing with such commendable energy. The present issue is devoted to "Schools of Forestry in Germany," and bears the marks of care and thoroughness which have distinguished his preceding works on the subject.

The recently published 'List of Seeds of Hardy Herbaceous Annual and Perennial Plants grown in the Royal Gardens, Kew, 1886' (Stationery Office, 6*d.*), demands a word of notice, if only to point out how completely and favourably it compares with the unfortunate production which we felt it our duty to criticise last year. The present issue is an excellent hand-list of garden seeds, well suited to the purposes for which it is printed: an index of genera would, however, add to its usefulness.

A new botanical Journal is being issued from the Royal Gardens, Kew, under the title 'Bulletin of Miscellaneous Information.' It is to contain "notes too detailed for the Annual Report on economic products and plants"—and has been issued monthly, so far, by the Stationery Office at twopence per number. It is in many ways a curious little production: the literary matter begins on the front page (there being no wrapper), midway between the title and the list of publishers; the numbers are headed "all rights reserved"; and each, consisting of ten pages, is paged separately. It will thus be extremely inconvenient for indexing and future reference. The subjects treated of so far are Teff (*Eragrostis abyssinica*), Oil of Ben, Cape Boxwood, Industries at Mauritius, Fibre Plants, Sisal Hemp, and Mauritius Hemp. We hope that in giving this information we have not infringed on the "rights" which are "reserved." As the last Report issued was, we believe, that for 1882 (published in 1884), the Bulletin may be regarded as a substitute, though a very imperfect one, for the interesting yearly summaries of work at Kew.

New Books. — Florence Caddy, 'Through the Fields with Linnæus' (London, Longmans: 2 vols., pp. 347, 376: 2 maps: 16*s.*). — H. Potonié, 'Illustrierte Flora von Nord- und Mittel-Deutschland' (Berlin, Boas: 8vo, pp. 511: 424 cuts: 5 *mark*). — H. Nanquette & L. Boppe, 'Cours de Technologie Forestière' (Paris, Levrault, 1887: 8vo, pp. xvi. 335).—P. Voglino, 'Observationes analyticæ in Fungos agaricinos Italiæ borealis' (Venezia, Antonelli: 8vo, pp. 56, tt. 3).

Articles in Journals.

American Naturalist (Jan.).—T. Smith, 'Parasitic Bacteria and their relation to Saprophytes.' — E. L. Sturtevant, 'History of Garden Vegetables.'—B. D. Halsted, 'Pollen-tubes of *Lobelia*.'

Botanical Gazette (Feb.). — C. R. Barnes, 'Revision of N. American species of *Fissidens*.' — L. H. Bailey, 'Chippeway Plant Names.' — (March). A. Gray, '*Delphinium*, an attempt to distinguish the N. American species.' — H. W. Wiley, 'Causes of variations in contents of sucrose in *Sorghum saccharatum*.' — J. M. Coulter & J. N. Rose, 'Umbelliferæ of U. States' (1 plate).

Bot. Centralblatt (Nos. 10, 11). — J. H. Wakker, 'Ueber die Infection der Nährpflanzen durch parasitische Peziza-Arten.'—(Nos. 12, 13). G. Istvánffy & O. Johan-Olsen, 'Ueber die Milch saftbehälter und verwandte Bildungen bei den höheren Pilzen.' — (Nos. 12, 14). H. Steininger, 'Beschreibung der europäischen Arten des Genus *Pedicularis*.' — (Nos. 10, 11, 14). V. Schiffner, 'De *Jungermannia Hornschuchiana*' (1 plate).

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Géographie Botanique de l'Europe.' — J. Costantin, 'Sur un *Rhopalomyces*' (*R. nigripes*, sp. n.).—P. van Tieghem & H. Douliot, 'Origine des radicelles et des racines latérales chez les Légumineuses et les Cucurbitacées.' — M. Colomb, 'Sur l'*ochrea* des Polygonées.' — L. Mangin, 'Récherches sur le pollen.' — Hérail & Blottière, 'Sur les affinités des Lardizabalées.' — E. Rouy, 'Excursions botaniques en Espagne.'—P. Marny, 'Sur la pollinisation et la fécondation des *Verbascum*.'—L. Trabut, 'Fleurs cleistogames et soutteraines chez les Orobanchées.'—P. Vuillemin, 'L'endoderme du *Senecio Cineraria*.' — A. Letourneux, 'Voyage Botanique en Tunisie.'—G. Bonnier, 'Culture des Lichens.'—X. Gillot, 'Hybrides entre les *Geum rivale* et *G. montanum*; *Hieracium præaltum* et *H. fallax*; *Potamogeton alpinus*.'

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Gardeners' Chronicle (Mar. 5).—*Galanthus nivalis* var. *caucasicus* Baker.— (Mar. 12). *Begonia egregia* N. E. Br., n. sp.— (Mar. 19). *Anthurium brevilobum* N. E. Br., n. sp.

Journal de Botanique (Nos. 2, 3). — A. Franchet, 'Sur les *Cleome* à pétales appendiculés' (*C. oxalifolia*, *C. polytricha*, spp. nn.: 7 figures).—(No. 2). P. van Tieghem, 'Sur les racines doubles et les bourgeons doubles des Phanérogames.'—(No. 3). P. Vuillemin, '*Streptotheca*, nouveau genre d'Ascobolées' (*S. Boudieri*).

Journ. Linn. Soc. (Bot.).—(Mar. 23). M. T. Masters, 'On the Floral Conformation of *Cypripedium*' (1 plate). — Tokutaro Ito, 'Berberidearum Japoniæ Conspectus' (1 plate). — C. T. Druery, 'New instance of Apospory in *Polystichum angulare* var. *pulcherrimum*.' — J. G. Baker, 'Further Contributions to the Flora of Madagascar' (many new species; *Gamopoda* (Menispermaceæ); *Trimorphopetalum* (Balsamineæ), genn. nov.).

Magyar Növénytani Lapok (Jan., Feb.). — L. Simonkai, '*Tilia Haynaldiana* (*platyphyllos* × *supertomentosa*) Simk.'

Notarisia (Jan.). — G. Cuboni, 'Diatomee raccolte a San Bernardino dei Grigioni da G. de Notaris.' — Id., 'Racteri e frammenti di *Oscillaria tenuis* Ag. inclusi nei granuli di grandine.' —I. Istvànffi, 'Diagnoses præviæ Algarum novarum.'

Oestern. Bot. Zeitschrift (Mar.). — A. Burgerstein, Memoir of Alois Pokorny (23 May, 1826—22 Dec. 1886).—*Campanula farinulenta* Kerner & Wettstein, sp. nov. — *Pinguicula bicolor* Woloszczak, sp. nov. — H. Sabrausky, 'Zur Batographie Niederösterreichs.'— J. Ullepitsch, '*Galeobdolon luteum* var. *Tatræ*.' — W. Voss, 'Merk-

würdige Verwachsungen von Stämmen der Rothbuche' (*Fagus sylvatica*).'—F. Kirásan, 'Ursachen der Haarbildung.'

Pharmaceutical Journal (Mar. 12, 19). W. Elborne, H. Helving, & H. D. Rolleston, On *Strophanthus*.

LINNEAN SOCIETY OF LONDON.

February 3*rd*, 1887.—William Carruthers, F.R.S., President, in the chair. — Dr. Michael C. Grabham (Oporto) and Capt. George Wingate (Cashmere) were elected Fellows of the Society. — Mr. George Maw exhibited a specimen in flower of *Narcissus cyclamineus* grown by him from bulbs sent by Mr. A. W. Tait, of Oporto. The plant in question was known to Parkinson in 1640 (Theatrum Botanicum); it has also figured in the Jardin du Roi, 1623, as "N. hispanicus minor amplo calice foliis reflexis," and in Theatrum floræ, in 1637, pl. 20, as "N. hispanicus minor lecteus amplo calice foliis reflexis," = *N. minor-cyclamineus* of Haworth. Afterwards, having been lost sight of, it was rediscovered by Mr. Johnston in 1885. Mr. Maw also showed a drawing of *Crocus Kardukharum*, and another of *C. zonatus* for comparison. The former was introduced in 1885, and flowered September, 1886. It was originally discovered by Theodore Kotschy in the neighbourhood of Sivas, 3° or 4° west of Mokus and Schewan, that shown being from the same locality. The plant is allied to *C. zonatus* of the Taurus, but it is a much smaller plant, with exceptionally short leaves, which are retained till the ensuing flowering time, the two years' sets of leaves occurring simultaneously.—Brigade-Surgeon J. E. T. Aitchison, C.I.E., then read a paper, "On the Flora and Fauna of Western Afghanistan." The author stated that the botanical collections amount to 800 species, and probably 10,000 specimens; about 100 are probably new to science; and that he had been able to accumulate much interesting information relating to economic products, and of tracing several of them back to the plants yielding them. The flora of North-western Afghanistan differs much from the typical flora of Eastern Afghanistan so graphically described by Hooker and Thomson in their introductory essay to the 'Flora Indica.' On comparison of data I have been led to the conclusion that this variation is due to altered climatic conditions. The winter is much more severe and of longer duration at similar altitudes than that experienced in Eastern Afghanistan, the temperature falling as low as several degrees below zero Fahr., and snow lying for some days at an altitude of 2000 ft. In spring the persistence of damp and cold is also more prolonged; rain which at any moment might be converted into sleet and snow occurring at times as late in the season as the end of May. The highest temperature is in July and August, reaching to 105° in the shade, and although the summer is very much shorter than that in the tropical zone, the climate is intensely hot, no dew falling under an altitude of 3500 feet. These extremes of temperature between

summer and winter, and night and day, are much intensified by the absence to the north of any mountain range which might have afforded considerable shelter from the continuous blasts of bitterly cold wind in winter and of hot dry air in summer, coming from the north-east and north-west respectively. The mountains in the vicinity not being sufficiently high to allow of perpetual snow, the water-supply is limited to the rivers Hari-rud and Murghab, and to a very few perennial springs. With these climatic conditions the result is, except under the ameliorating influence of a river, that cultivation under an altitude of 3500 ft. is impossible without the aid of irrigation, and until the dew-line is gained it is a land totally devoid of trees or even shrubs. But as soon as this point is reached, *Pistacia vera*, *Juniperus excelsa*, and a *Lonicera* appear as forest trees, and wheat and barley no longer need irrigation. My collections are chiefly composed of Northern Persian and Mediterranean, with a very few South Persian and Arabian forms, augmented by Central Asian and Siberian types; a few Western Himalayan or Tibetan, and a very limited number from the Punjab and Scind regions; besides a fairly represented local flora, comprising in all probability one-sixth of the whole collection. I met with no indigenous *Coniferæ*, except *Juniperus excelsa;* but *Pinus halepensis* is cultivated. There were no oaks, nor any species of the genera *Æsculus*, *Olea*, or *Myrtus*. The tropical zone spoken of by Hooker and Thomson as skirting the Afghan region does not extend to the north-west, owing to the excessive fall in the winter temperature and the shortened summer, a conclusive proof of which is the absence of the date palm. The area of *Pistacia* (Kinjak) is limited to the southern aspect of the Doshakh range. A few subtropical shrubs from Scind and the Punjab do manage to exist through the low winter temperatures, viz., *Peganum Harmala*, *Prosopis Stephaniana*, *Alhagi Camelorum*, and *Capparis spinosa*, with the grasses, *Erianthus Ravennæ* and *Andropogon laniger*. *Populus Euphratica* forms forests in the river-beds, but as long as this tree is situated near water it is indifferent to altitude, as it is known to extend from Scind and the Punjab to Western Tibet up to a height of 12,000 ft. A more curious extension is *Haloxylon Ammodendron*, from the apparently dry shifting desert sands of Baluchistan to the river-beds of this area. *Pulicaria foliosa* is the only plant whose area extends from India proper (Banda, in Bandelkhand, on the Jumna river) to this region. Out of 75 natural orders, *Compositæ* and *Leguminosæ* greatly preponderate over the others, as might have been expected, containing 81 and 80 species respectively. In *Compositæ*, Cousinia heads the genera with 18 species, 12 of which have been identified, the remainder being probably new; and *Centaurea* with 10 species. Of the 80 species of *Leguminosæ*, the large proportion of 39 belong to the genus *Astragalus*, and amongst them Mr. Baker has discovered no fewer than 14 new species, which we have described; besides others, for the description of which there is not enough material. *Gramineæ* follow closely with 61 species, none of which, however, are new, though many are extremely interesting. There are 56 species of *Cruciferæ*, several of

which are new to science. Next come *Chenopodiaceæ* with 39 species, *Labiatæ* with 35, *Boraginaceæ* with 32, *Umbelliferæ* with 30, and *Caryophyllaceæ* also with 30 species, *Rosaceæ* with 27, *Liliaceæ* with 26, *Euphorbiaceæ* with 16, *Polygonaceæ* with 15, *Ranunculaceæ* with 14, *Rubiaceæ* and *Cyperaceæ* each with 13, *Scrophulariaceæ* and *Plantaginaceæ* with 11 and 10 respectively. Some of the Himalayan types met with were *Sisymbrium Himalaicum*, *Sophora mollis*, *Rosa moschata* (cult.), *Prangos pabularia*, *Pterotheca Falconeri*, and *Epilasia ammophila*, with several of the Chenopodiaceous shrubs found in the arid Tibetan region. The flora of Central Asia is represented by *Nigella integrifolia*, *Corydalis Sewerzowii*, *Isatis Boisseriana*, *Crucianella filifolia*, *Kuschakewiczia turkestanica*, *Convolvulus subhirsutus*, and several others; with *Astragalus buchtormensis* and *Orobus subvillosus*, Soongarian and Siberian types. I had little opportunity afforded me for investigating the alpine flora of this country, as I was seldom able to collect in localities above 5000 ft. in altitude; above this height in exposed positions I found that trees and shrubs had disappeared. The change in the vegetation was represented by certain types of plants, as *Acanthophyllum*, *Astragalus*, *Onobrychis*, &c., assuming a peculiar habit, forming dense solid bushes, which look like small knolls or hummocks. Above their level occurred a belt of *Euphorbia* exactly as seen in Kashmir and Kurrum, and still higher the soil was covered with a close pasturage of *Pedicularis*, *Alyssum Persicum*, *Erysimum persepolitanum*, and *Astragali*. At 7000 ft. the soil became absolutely sterile. What are generally understood as being subalpine forms, as *Rheum Ribes*, a Primula and a Gentian, the only one I met with extended down as low as 2000 ft. in some places.

The author gave a sketch of the physical peculiarities of the region traversed; he alluded to the agricultural and horticultural products, and made special remarks on the plants yielding pharmaceutical substances. One of the chief grasses and most prolific, in early summer covering the ground everywhere, was *Poa bulbosa*, growing from ten to eighteen inches in height, which in these parts might be collected with the greatest ease as fodder, sufficient to supply the needs of any number of cattle. *Stipa pennata* is one of the few grasses which extends to the sterile portions of these plains, covering them with its great spreading tufts. Close to the hills and at an altitude of 3000 ft. *Amygdalus eburnea* occurs as a low shrub. Where there was the least shelter, as in dry watercourses and irregular depressions of the ground, *Tamarix gallica* var., with *Lactuca orientalis*, *Pteropyrum Aucherii*, *Calligonum*, *Atraphaxis*, *Ruta*, *Stellaria*, *Convolvulus erinaceus* and *fruticosus*, and *Nitraria*, with Cousinias and Centaureas, and *Ephedra* formed a low scrub. Where there was any indication of moisture, as in the vicinity of cultivation, *Ammothamnus Lehmanni* and *Sophora pachycarpa*, with *Zygophyllum Fabago*, and *Cleome coluteoides* having curiously inflated pamphid coloured fruit, were in abundance; and in certain localities where the clay soil was largely charged with saline matter and cut up into low irregular mounds—one could scarcely call them hills—a curious plant, *Miltianthus portulacoides*, was found.

ANGOLAN *SCITAMINEÆ*.

By H. N. Ridley, M.A., F.L.S.

The number of Scitamineous plants known from Tropical Africa is small in comparison with that of Malaya or South America. This is due in part to the fact that the dry grass plains subject to fires are quite unsuited for the growth of these plants. Over a large eastern and southern area the *Zingiberaceæ* are represented only by a few endemic Kæmpferias and Amomums, and some introduced plants, such as turmeric and ginger. In Madagascar, besides these genera, *Hedychium* and *Myrosma* are represented. In Western Africa the damp forests and river-banks produce many species, and doubtless more will be found when the country is more clearly investigated. While the affinities of the eastern species are almost always Asiatic, those of the western regions have a considerable mixture of American forms, so that we may say that the Asiatic and American genera meet in West Africa. *Kæmpferia*, *Curcuma*, *Amomum*, *Clinogyne*, and *Phrynium* are all otherwise Asiatic genera. *Renealmia*, *Thalia*, and *Calathea* are typical American genera. To the first series belongs also *Hedychium*, to the latter *Myrosma*, both found in Madagascar, but not at present in Tropical Africa. The distribution of these plants agrees very well with that of the *Orchideæ*, *Cyperaceæ*, and some other orders, in all of which there is evidence of the invasion of Africa and its eastern islands by an Indo-Malayan flora, some part of which never succeeded in reaching the mainland, and a former land-connection with South America, probably of earlier date, outliers from the flora of which still remain in the interior of Madagascar. These American forms of *Scitamineæ*, like those of the other orders above quoted, cannot have been either accidentally or purposely introduced at an early date, as it is certain some American species of higher orders were. For though they belong to American genera, nearly all the species are endemic; and in some genera, e.g., *Costus*, where, though the majority of species are South American and West Indian, there are also a few Asiatic forms, and the relations of the West African species are with those of South America and not of Asia. The Cannas, of which far the greater number are American, are represented in Asia and Africa by what appears to be a single species very widely diffused and somewhat variable, *C. indica*, but it is interesting to note that the West African forms resemble rather those of South America than of Asia. The African *Musaceæ* include *Musa sapientum* and *M. paradisiaca*, probably but not certainly both introduced, from Asia; besides these, there are *Musa Ensete* Rich. and the closely-allied *M. ventricosa* Welw., both endemic; and in the south the Strelitzias, and in Madagascar a single species of *Ravenala*, the only other species of the latter genus being a native of Guiana.

Zingiberaceæ.

Zingiber officinalis L. is cultivated in some localities in Golungo Alto, No. 6463.

Amomum Melegueta Roscoe. — "Malagueta." Flowers white, with a purple or rosy tint. The seeds are used by the natives as a kind of pepper.

Prince's Island, in the high shady primæval woods of Pico de Papagaio from about 2500 to 3000 ft. altitude. In leaf and fruit September, 1853, No. 6459. St. Thomas Island, in the higher shady woods, where it is here and there cultivated. On the way to Mt. Caffé, out of flower and fruit, Dec. 1860, No. 6460.

Var. *violacea*. — Flores pulchre violacei. Corollæ tubo dense transversim plicato. Labellum quam in forma typica brevius.

"The true Dongas of the Congo. Of all the species met with this was the least aromatic." The seeds, however, are quite as pungent as those of the common forms.

Golungo Alto. Not rare on the banks of the streams coming down from the lofty mountains towards the River Cuango, and on the mountains of Queta, at Zengas, and also on the banks of the Cuango, November and January, Nos. 6457, 6458.

A. Danielli Hook. fil., Journ. Bot. iv. t. 5. *A. Clusii* Bot. Mag. t. 5250.—Prince's Island. "Flowers scarlet." Common in shady woods in the littoral and mountain regions round S. Antonio. In flower and leaf September, 1853, No. 6455.

Amomum alboviolaceum, n. sp.—Rhizoma tenue, fasciculos foliorum 2–3 pedales emittens. Folia petiolata, petiolis 6-uncialibus vaginantibus ligulis duabus lanceatis acuminatis ad basin laminæ vix ¼ uncialibus; lamina circiter 5 uncias longa 1½ uncia lata lanceolata acuta. Scapi breves 3 unciales squamis latis ovatis obtusissimis tecti. Flores pauci 2–3 magni, inodori, albescenti-violacei circiter 3 uncias longi. Sepala lateralia angusta lanceata acuminata. Labellum ovatum quam in *A. Melegueta* magis acuminatum circiter 1½ uncia latum. Antheræ paullo pubescentes. Staminodia lateralia linearia acuminata acuta minima. Connectiva lata triangulari pubescens appendicibus angustis lanceatis acuminatis. Stylus filiformis gracilis pubescens. Stigma clavatum subtriangulare hispidum.

Pungo Andongo. Very common in thickets and thin woods in sandy and clayey spots, on the right-hand side of the River Cuanza. Flowering in December, No. 6453.

This species is allied to *A. Melegueta* Rosc., but differs especially in its foliage.

A. erythrocarpum, n. sp. — Herba 5 usque ad 12 pedalis omnino aromatica. Rhizoma validulum paullisper aromaticum. Folia elliptica lanceolata 18 uncias longa, 3½ uncias lata, cuspidata nitida coriacea, costa prominula crassa, vagina 6 uncialis; ligula brevis membranacea truncata. Scapus brevis, biuncialis. Bracteæ latæ ovatæ obtusæ emarginatæ cuspide mediano minuto. Flores grandiusculi pulchre flavi. Lobi calycis angusti acuti. Corolla labello subæqualis. Labellum breviusculum oblongum ellipticum emarginatum uncia longum ⅓ uncia latum. Antheræ rectæ glabræ. Appendices connectivæ angustæ acuminatæ. Capsula conica rostro longo, ferme 4 uncias longa, coccinea. Semina polita conico-cylindrica pallide brunnea ¼ uncia longa.

St. Thomas Island, December, 1860, No. 6449. Pungo Andongo, Mate de Pungo, No. 6452. Golungo Alto, common by streams in the loftier parts of the mountains where densely covered with woods. Sobati of Quilombo and Queta, No. 6456. Near Banza, No. 6451. Flowering in May, November, and beginning of December. In fruit, January, February, and May.

Two or three other species are in the collection, but too incomplete to describe.

Kæmpferia æthiopica Benth. var. *angustifolia*. — Glaucescens, tubera longa aromatica. Folia arcuata canaliculata carnosula, angusta lanceolata acuminata basi angustata 8–10 uncias longa, ¾ uncia lata quo latissima. Flos roseo-purpureus, siccatus cæruleus.

Pungo Andongo. Common in damp meadows by the banks of the River Cuanza, from Sansamanda to Quisonde. A single plant was found in flower near Conde, in March, 1857, No. 683. Dr. Welwitsch cultivated it in his garden at Loanda, but it would not flower. He compares the colour of the flower to that of *Orchis papilionacea* var. *rubra*. It is quite possible that this plant may eventually prove specifically distinct from the eastern plant; but I have not sufficient materials, as there is only a single flower in the collection, which I have not been able to examine properly. It seems, however, to be of the same size and colour as the typical plant, which appears to be common all over Eastern Africa.

Costus afer Ker. Bot. Reg. t. 683. *C. maculatus* Rosc. var. *roseus*.—Flores albi, labello roseo purpureo.

Golungo Alto. Common on the edges of streams, concealed among gigantic grasses, and almost always in company with *Canna indica* L. Cambondo, Sept. 19th, 1854, by streams between Trombeto and Cambondo, No. 6464. A herb 5–6 ft. high, with somewhat nodding stems. The strobiles are as large as the cones of *Pinus maritimus*. Sometimes the scape arises directly from the rhizome quite leafless, but covered densely with scale-leaves.

The form with leafless scapes was made by Roscoe (*Scitamineæ*, pl. 82) into a distinct species, under the name of *C. maculatus*; but George Don, who obtained both forms in Sierra Leone, asserted that they were specifically identical, which is confirmed by the above quoted note by Dr. Welwitsch. All the published figures taken from cultivated specimens give the colour of the lip as white, with yellow blotches. Christian Smith's specimens—obtained on the Congo, like those of Dr. Welwitsch—have a purple or rosy lip.

Costus giganteus Welw. MS.—Rhizoma repens crassissimum, radicibus multis. Caules foliiferi 4–5 pedales. Folia 12–24 uncias longa, 4–5 uncias lata oblonga lanceolata cuspidata nitida viridia, petioli circiter ½ uncia longa, vaginis longis, ligula circiter ½ uncialis. Scapi 3–5 vel plures in rhizomate erecti 6–8 mis 10 pedales, læte virides, vaginis viridibus rubromarginatis undique tecti. Strobilus ferme 6 uncias longa, 3–4 uncias in diametro, lucida rubra. Flores flavi. Bracteæ late ovatæ obtusæ 1½–2 unciales longæ, 1–1½ uncia latæ copiosæ et arcte appressæ. Bractea interior lanceolata cymbiformis obtusa multicostata 1¼ uncia longa. Sepala ¾ uncia longa lanceolata obtusa, ¾ longitudinis connata multistriata et minute punctata, margines scariosæ.

Island of St. Thomas. By streams in primæval woods on Mt. Caffé, from 2000 to 2800 ft. altitude, flowering from October to February, No. 6465.

The affinity of this plant is with *C. cylindrica* Rosc. of the West Indies. The inflorescence seems to be larger than that of any other known species.

Renealmia africana Benth. — Leaf-bearing stems 4–5 ft. tall. Flower-spikes several on a rhizome, a foot tall. Flowers fleshy, straw-coloured, with whitish flesh-coloured bracts. Fruit dull cinnamon-coloured, the apical tube orange. Seeds covered with red filaments, deliciously aromatic.

Golungo Alto. Not rare in the shady parts of the primæval woods at Sobati de Quilombo, Quiacatubia, and Mata de Quisuculo. In flower and fruit in January, 1855, No. 6442. It was first obtained by Mann at Fernando Po and Corisco Bay.

Maranteæ.

Thalia Welwitschii, n. sp.—Herba 3–5 pedalis, rhizomate brevi horizontali. Folii lamina ovata glauca, 9 uncias longa, 3½ lata, petiolus pedalis, basi (3½ uncias) vaginans apice (¼ uncia) incrassata. Panicula efoliata laxa haud multo ramosa. Flores purpurei, duo intra bractea unilaterales in rachide flexuoso biunciali. Bractea exterior cymbiformis lanceolata subacuta ⅝ uncia longa, cinerascens violacea. Bractea interior ovata obtusissima. Calyx laciniis brevibus obtusis ovatis. Petala, posticum longum lineare ligulatum obtusum angustum, lateralia breviora lanceolata obtusa. Andrœcium lacinia staminifera cuneata rotundata emarginata. Antheræ stipes longa. Stigma elongata complanata breviter retusa. Fructus globosus.

Cazengo. Rather rare in damp spots between Cacula and Dalatanda, No. 6443. Pungo Andongo. In marshes in the woods of Mutollo, No. 6445. Flowering in June.

T. cærulea, n. sp. — Radix fibrosa. Folia lamina anguste lanceolata acuminata acuta obliqua, 10 uncias longa, uncia lata quo latissima, petiolus, 1–2½ pedalis longe vaginantia. Caulis 5–7 pedalis gracilis subteres, sicco canaliculatus. Panicula laxa pauciramosa bracteis 2–3 membranaceis brunneis loratis caducis obtusis ad basin. Ramuli flexuosi, internodis brevibus. Bracteæ exteriores ovatæ lanceolatæ cinerascente violacei, ½ unciales. Interiores obtusæ ovatæ. Flores cærulei iis *T. dealbata* æquales. Sepala brevia ovata obtusa. Petala, posticum angustum lineare loratum obtusum ¾ uncia longum, alia longe superans, lateralia elliptica lanceolata obtusa. Andrœcium lobus staminifer late lanceolatus obtusus. Anthera elliptica filamento distincto, lobus petaloideus lanceolatus obtusus. Labellum lanceolatum triangulum basi lato. Stigma appendicibus angustis ligulatis obtusis. Capsula baccata; semen singulum magnum oblongum ¼ uncia longum.

Pungo Andongo. In marshes by the River Cuanza, near the Sobati Nbille, March, 1857, No. 6444.

Clinogyne purpurea, n. sp. — Caules plures in rhizomate 2–3 pedales graciles. Folia ½–1½ pedalia, majora, 6–8 uncias lata,

ovata vel oblonga-ovata cuspidata, cuspide semiunciali; petiolus incrassatus, ½ uncialis, lamina superne glauco-virens pinnatim albo-striata subtus canescenti-alba, unius lateris margine excepto late viridi-vittato. Panicula erecta ramis gracilibus patulis hispidis. Bracteæ 1¾ uncia longæ cuspidatæ, pubescentes. Flores parvi azurei vel cærulescentes purpurei. Sepala lanceolata chartacea striata obtusa. Petala quam andrœcium longiora lorata obtusa tenuia. Labellum parvum angustum. Stylus quam androecium longior apice convoluto. Bacca globosa ¼ uncia longa hispida nitida coccinea sæpius disperma trilocularis.

Golungo Alto. Common in primæval woods by streams at 2000–2500 ft. altitude. Flowering and fruiting January to March, 1855, No. 6440. "Subi" or "Subi Cafile" of the natives.

Allied to *C. cuspidata* Benth., but distinct in its purple flowers, small lip, and long style.

Phrynium textile, n. sp.—Planta speciosa 5–6 pedalis, caulibus erectis altis ferme lignosis. Folia lamina elliptica ovata basi latiore, 12 uncias longa, 6 uncias lata. Petioli 3½ pedales vel minus basi vaginante apice triunciali incrassato, omnino glabro, pilis paucis ad basin exceptis. Anthela spicis pluribus subcapitatis in pedunculo brevi 1½ uncia longo. Bracteæ exteriores 2 unciales coccineæ subacutæ basi et marginibus pubescentibus. Sepala angusta linearia lanceolata acuminata. Petala lanceolata cuspidata latiora. Andrœcium petala paullo superans intus punctata. Staminifer spathulatus; lobus petaloideus latus subovatus rotundatus. Labellum integrum cucullatum. Stamen petaloideum spathulatum rotundatum bilobum. Stylus validus incurvus. Stigma crassum bilobum. Capsula tenuis monosperma. Semen oblongum obtusangulum nigrum.

Golungo Alto. Common, and promiscuously mixed with *Clinogyne purpurea*, which, like this plant, is called "Subi" by the natives. "Subi" signifies a textile plant. This is the "Subi grande." In the primæval woods of Quisuculo, by streams. The flowers were hardly open in September, No. 6439.

This plant has some affinity with the Indian *P. capitatum* Rosc.

Trachyphrynium violaceum, n. sp. — Suffrutex scandens, caulibus ad basibus duris lignosis cylindricis et nodosis. Folia papyracea glauco-virentia elliptica ovata vel oblonga-ovata obtusa vel basi subcordata apice acuminata vel cuspidata majora 8 uncias longa, 3 uncias lata; petiolus uncialis vagina 4 uncialis. Anthela ramosa ramis abrupte flexuosis 6 uncialibus. Bracteæ lanceolatæ subobtusæ unciales, caducæ floribus apertis. Flores purpurascenti-violacei ad atropurpurei singuli vel in paribus pedunculis vix ½ uncialibus. Sepala lanceolata acuminata ½ uncialia, ¼ uncia lata ad basin quam tubus corollinus brevius. Petala dimidio connata lanceolata acuminata andrœcio multo longiora. Andrœcii tubus obconicus. Staminifer oblanceolatus obtusus. Anthera elliptica, filamentum breviter liberum. Stamen petaloideum angustum lineari-lanceolatum. Labellum cucullatum cordatum triangulare apice longo obtuso papillis paucis in medio. Stylus crassus in labello convoluto. Ovarium papillis copiosis vestitum. Capsula

triangularis depressa papillis brevibus obtusis omnino vestita, 1½ uncia in diametro triloculari; loculi monospermi demum valvatim dehiscens. Semina subsphærica.

Pungo Andongo. Rather rare in the primæval woods of Mutollo and within the fortifications in Barrancos de Catete, No. 6441. Golungo Alto, in the primæval woods of Sobati Galanga, No. 6441*b*. Flowering January and February. Fruit, February and April. This plant is woody for some way up from the ground, and climbs to a considerable height, the branches at length becoming dependent. What seems to be the same plant, but without inflorescence, was obtained on the Congo by Christian Smith.

Cannaceæ.

Canna indica L. — Golungo Alto, in reed-beds by the streams, and in damp woods, almost always growing with *Costus*, on the banks of Cuango, and on the banks of Casaballa and Quilombo, No. 6448. Pungo Andongo, within the fortifications by the streams. Common, and even forming little thick woods, 5–7 ft. tall, No. 6448*b*. Flowers brilliant scarlet; leaves deep green, not glaucous. Flowering, October and March. Fruiting, March.

Musaceæ.

Musa sapientum var. *sanguinea* Welw. (haud *M. sanguinea* Hook.). — Caulis 5–8 pedalis quam ille *M. sapientum* typicæ minor et gracilior, 3–4 uncias in diametro luride viridis, maculatus præsertim ad basin striis sanguineis. Folia oblonga linearia 4–6 pedes longa, ½–1 pes lata, apice obtuse mucronato, superne atrosanguinea, subtus pallide purpurascentia, albo pruinosa, versus costa virescentia. Flores et fructus ignoti.

Golungo Alto. Cultivated in gardens and around the Mandioca fields near Sange, &c.; common at Ponte de Luiz Gomez, No. 6446. Cazengo, cultivated in damp spots round houses at Cazengo, No. 6446*b*. This plant, called the "Bananeira roxa" by the Portuguese, is rather smaller than *M. paradisiaca*. The fruit was said by the natives to be dark purple, like the leaves. The specimens in Golungo were said to have come from Cazengo.

M. ventricosa Welw. Apontam. Phyto-Geogr. p. 544, 578.—This species is evidently closely allied to *M. Ensete* Rich. and is a really wild Banana, possibly the parent of the cultivated *M. Ensete*. Like that plant, it has a short stem swollen out with a bulb at the base 4 ft. thick. The leaves are generally more linear than those of *M. sapientum*, and also much thicker and stiffer, with much thicker rose-coloured midribs. They stand more erect on the stem, and are not split so easily into many laciniæ as those of the cultivated bananas. The petioles are dilated and swollen out in a spongy manner, 1½–3 ft. broad and 2½ in. thick, gradually narrowed above. Under the gigantic spike are five or six lanceolate sterile bracts. The flower-bracts are persistent, 8 in. to a foot long, 3–4½ in. broad (in the dry specimen). Flowers 2 in. long. Calyx-lobe bifid, a little longer than the stamens. Corolla broad and thin, acuminate. Staminode short. Fruit small, when ripe almost filled with the

large stony black seeds ½ in. thick, which are embedded in a black or blackish brown half-dry somewhat slimy mass, and their position in the fruit is shown on the exterior by hemispherical humps. The monkeys eat the fruit while still unripe, as well as the seeds, which are full of a white farinaceous albumen.

Pungo Andongo. Not rare in damp rocky places, but rarely fruiting. In flower, fruit, and leaf in May, and flowering also in January, No. 6447.

FORMS AND ALLIES OF *RANUNCULUS FLAMMULA* LINN.

By CHARLES BAILEY, F.L.S.

[THE form of this paper and the local allusions are explained by the fact that it is a newspaper report, revised for this Journal, of a recent address to botanical students at Manchester.—ED. JOURN. BOT.]

THE polymorphism of the common spearwort (*Ranunculus Flammula* L.) is much more strongly marked than that of the great spearwort (*R. Lingua* L.), or that of the creeping spearwort (*R. reptans* L.); it seems to link the two last-named species to each other, although its affinities are decidedly with *R. reptans*. The compressed carpels with their broad-based beak, and the non-furrowed peduncles of *R. Lingua*, always separate it from the inflated short-beaked carpels and furrowed peduncles of the other two species; it is by ignoring these characters that young students sometimes mistake for it the large-flowered coarse-growing erect forms of *R. Flammula*, which occur chiefly on the Cheshire side of the Manchester district. In the limits of the Manchester flora *R. Flammula* is everywhere distributed, as our marshy lands and numerous bogs and mosses would indicate. *R. Lingua* is mainly confined to the margins of the Cheshire meres, but it is an infrequent species. *R. reptans* does not occur in our district, its nearest station being eighty miles to the north, upon the eastern and western shores of Ullswater; but it is a species which its geographical distribution in Europe would suggest as likely to occur on the sandy or shingly margins of any of our British lakes.

R. Flammula assumes a wide range of forms, which present remarkable contrasts to each other, and it will be well to point out the principal directions of its variability.

The ordinary form of our ditches is one in which the stems are at first decumbent, with numerous rootlets from the lower nodes, and from the prostrate base rises an erect branching stem, each branch being terminated with a lemon-coloured flower. This is the form named by Dr. Boswell *suberectus*, and it is universal in the British Islands from John o' Groats to Land's End. It is the form which occurs in masses, and proves itself to be an eminently social plant by its neighbourly habit of growth. The radical leaves have long stalks, which are amplexicaul at their base; their blades are ovate or elliptical, and strikingly unlike the linear or lanceolate

sessile stem-leaves. Oftener than not their margin is denticulate, and when the denticulation is pronounced the plant is the variety *serratus*.

There is a form of *R. Flammula* where all, or nearly all, the leaves are ovate in shape, as figured in Dr. Richard Deakin's 'Florigraphia Britannica,' vol. ii. fig. 900, p. 789; it would appear to be a rare form in Britain, but a specimen, without locality, and probably from Yorkshire, occurred in the herbarium of the late Mr. John Hardy. From the facies of the plant it would appear to have been a wholly aquatic form, and that the almost rotund leaves were floating leaves. It answers to the var. *ovatus* of Persoon, "fol. omnibus ovatis longe petiolatis. Poir. Circa Caen." (Synopsis Plantarum; pars secunda, p. 102).*

When the stems of *R. Flammula* are weak and unable to support themselves in an erect condition, the species assumes two forms, according to its habitat. If the plant occurs in water, the stems and leaves float upon the surface, and only the extremities of the flowering branches rise above the water; this form possesses long and slender stems, with long rootlets from all the lower nodes. I collected it, in October last, in a shallow pool in the neighbourhood of the Gurnard's Head, in the south of Cornwall; it appears to answer to Persoon's var. *natans*, "fol. inferiorib. ovatis integris, superiorib. linearibus. In aquis prope Montmorency et in Barbaria" (*l. c.*, p. 102). The radical leaves of this form constitute a striking feature; sometimes their base is cordate, and, in common with other forms of *Flammula*, show a close affinity to the root-leaves of *R. Lingua* L., which are produced only in spring and long before the flowers: these latter formed the subject of a very interesting paper by Mr. F. C. S. Roper, read to the Linnean Society a few years ago; and M. Fr. Crépin, the Belgian botanist, in 1865, directed the attention of students to the study of the differences between the spring and summer leaves of this and other aquatic plants.

On the other hand, when a weak-stemmed plant of *Flammula* grows upon the surface of the ground, whether submersed or not, it constitutes Dr. Boswell's variety *pseudo-reptans*, and it is the extreme conditions of this form which link *Flammula* so closely to *reptans*. The form nearest to *suberectus* has straight internodes, and the lower nodes have always a few adventitious roots.

The straight internodes are relied upon as the principal character by Dr. Boswell and Sir Joseph Hooker for differentiating *pseudo-reptans* from *reptans* proper; but a curious form grows on the Cumberland side of Lake Windermere, under water, where all the internodes, except the first, are arched, and almost every node produces roots, just as in *reptans*, so that the only distinguishing characters from the latter are comparative, such as its larger flowers, and thicker stems and roots. This form of *pseudo-reptans* has a central rootstock, from which radiate a large number of

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* [There is a remarkable specimen in the British Museum Herbarium, which probably belongs to this form, but it is a robust, apparently erect, plant; the lowest leaf (which is not a radical one) is 2¾ in. long by 2 in. broad.—Ed. Journ. Bot.]

creeping branching stems, anchored to the ground as described, and interlacing with the creeping and rooting stems of contiguous plants, so that a somewhat dense growth of stems and leaves covered the bottom of the shallow edge of the lake. A separate plant would cover a circle two feet in diameter. The stems were somewhat robust, and their nodes produced two or three long rootlets, and with usually only a single linear leaf; but rarely a mass of roots, or a tuft of leaves, as in the filiform stems of *reptans*. The plant, however, advances beyond Dr. Boswell's definition of the variety, in possessing arched internodes for all internodes after the first, which latter is erect, but very short. It is the most extreme form of *pseudo-reptans* which I have met with. The exact locality of this form is a small bay about half a mile below the Ferry, where the Sawrey and Hawkshead Road leaves the shore of the lake.

The English Lakes also furnish us with another interesting form of *pseudo-reptans*, which is so near to true *reptans* that a careful botanist has great difficulty, even on the spot, in assigning a name to individual plants; this is a form which grows with *reptans* and *suberectus* on the western margin of Ullswater. In the locality in which they occurred, the area between the summer level of the lake and the portion which is beyond the highest water range (quite a narrow area of coarse sand and shingle) was covered nearest the water with a profusion of *R. reptans* L.; and above it numerous plants of *Flammula* with weak, not filiform, internodes, which, from its linear leaves and identical habit of growth, looked like *reptans* with somewhat larger flowers, stouter stems and roots, and longer branches, agreeing very well with plants collected by Mr. W. H. Beeby in Shetland, on the stony margin of Littlesetter Lochs. This form is the var. *radicans* of Nolte (*teste* Dr. Joh. Lange). The members of the Botanical Exchange Club have recently received specimens of the Ullswater plants, which will illustrate their transitional character. Beyond this area there was a thick fringe of typical *suberectus*, so that in a space of not more than four or five yards a most interesting piece of evolution was being worked out.

An interesting question which arises is—Which of the two creeping forms here noticed is the primary one? or are they both modifications in two different directions of some form which has already undergone evolution? The latter suggestion seems the more likely of the two. Temperature and other climatic agencies may be assigned as the chief factors in producing variation, because the distribution of *R. reptans* is decidedly northern or arctic and sub-arctic, whilst that of *R. Flammula* occurs in its highest development in such temperatures as those of our own islands and of continental Europe. If *reptans* has been associated with glacial temperature, and has adapted itself to arctic conditions, it accounts for its occurrence in neighbourhoods where glacial action is or has been prepotent, and in our own islands we may look upon it as a relic of an arctic vegetation, most of the members of which have disappeared from our flora, or only occur at considerable northern elevations or latitudes. The creeping habit of the plant, with its power of

rooting at every node, and of thus anchoring itself to the ground, fit it to hold its own against the fierce blasts of arctic regions; and in times of short summers, when its seeds could not be brought to maturity, its vegetative organs may have preserved it from decimation or extinction. It is not a little remarkable that, of the two forms, *R. reptans* perfects its fruits more frequently than does *R. Flammula*: at least my experience of the latter is that its fruits are infrequently produced in this country, whereas nearly all the British specimens of *R. reptans* which have passed through my hands possessed what appeared to be fertile seeds.

The discovery of *R. reptans* is a noteworthy addition to the English Flora made by Mr. Bolton King, in August, 1880, on the eastern shore of Ullswater, the only other certainly known British station for this plant being the shores of Loch Leven, in Kinross. Mr. King found the plant growing all the way from Pooley Bridge to Sandwick, but he could find no examples of it on the western shore of the lake. (See 'Report of the Botanical Exchange Club of the British Islands for 1880,' p. 28.) The locality in which I met with *R. reptans* on July 16th, 1886, is on the western shore in the small bay where the Glencoin Beck empties itself into Ullswater, and on the southern or Westmoreland side of the beck; this station is in the same county as the localities discovered by Mr. Bolton King, on the opposite shore, *viz.*, Watson's County 69; but, as far as could be judged, there is no reason for believing that the same plant does not occur on the northern side of Glencoin Beck, in which case it would be an additional county record for the plant, *viz.*, Cumberland, County 70. At the time I collected it I believed I was in Cumberland, and so did not prosecute the search further north. There are several spots between Glencoin Beck and Lyulph's Tower in which the true *reptans* is likely to occur.

From what I know of the habits of *reptans* it would seem to be partial to the edges of lakes, as in Loch Leven and Ullswater, in our own country; and on the margin of Lake Geneva, and other continental, Scandinavian, and North American fresh-water lakes. I shall not soon forget the first occasion (in July, 1865) upon which I saw the plant in a living state on the sandy margin of Hiterdals Vand, in southern Norway; the sides of the lake were covered with a carpet of this little plant growing in felted masses over many acres, and fruiting most abundantly.

A LIST OF PLANTS OBSERVED IN S. DERBYSHIRE.

By the Rev. W. H. Purchas, L.Th.

(Concluded from p. 107.)

Picris hieracioides L. "Near the Ashby Lodge," *Bloxam*! Rather scarce in the district.*

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* *P. echioides* L. (*Helminthia*) used to occur by the roadside between Swarkestone and Chellastone, a little way beyond the N. boundary of the district to which these records apply.

Crepis virens L.

Hieracium Pilosella L. Dry banks, especially on limestone. — *H. vulgatum* Fr. "Anchor Church," *Bloxam*! — *H. boreale* Fr. Bank of the Tramway at Heath End, Calke.

Hyphochæris radicata L. Pastures.

Leontodon hirtus L. Heathy places.—*L. hispidus* L. Meadows. It is curious that both my list and Mr. Bloxam's collection omit the ubiquitous *L. autumnalis*.

Taraxacum officinale Web.

Lactuca virosa L. Stanton-by-Bridge, where it was previously noticed both by the Rev. Churchill Babington (N. B. G., p. 638) and by the Rev. W. H. Coleman. I saw it there for several seasons. Mr. Painter tells me that he failed to find the plant. It may, however, be expected to reappear. — *L. muralis* Fresen. Shady banks.

Sonchus arvensis L.—*S. oleraceus* L. *Bloxam*!—*S. asper* Hoffm.

Tragopogon pratensis b. *minus* (Mill.). *Bloxam*!

Jasione montana L. Stanton-by-Bridge, about the old sandstone quarries.

Campanula latifolia L. Near Calke Mill. — *C. rotundifolia* L.— *C. patula* L. "Rare, near Melbourne," *Bloxam*! I searched for it in the spot which Mr. Bloxam described to me, *i. e.*, between Melbourne and Bredon, but without finding it. Mr. Bloxam's specimen, although only a fragment and immature, is the true plant, since it shows the toothing of the sepals. Pilkington's record of it as "frequent" is, as Mr. H. C. Watson pointed out, a palpable error.

Specularia hybrida DC. Fields on Melbourne Common.

Vaccinium Myrtillus L. The Rev. W. H. Coleman told me that he had met with this on an outcrop of the millstone grit, not far from the Tickenhall Lime-works.

Calluna Erica DC. Repton Rocks and Melbourne Common.

Erica tetralix L. Repton Rocks.

Primula vulgaris Huds. Woods and plantations. — Var. *caulescens*. This, or perhaps rather one of the "hybridæ," occurs from time to time.—*P. veris* L.

Lysimachia Nummularia L. About the ponds at Calke. — *L. nemorum* L. Near Calke Mill.

Anagallis arvensis L. Waste ground, not common. — *A. tenella* L. Very rare. This appeared in one spot on the face of a steep and moist roadside bank between Calke and Melbourne. Clearly, like *Ranunculus Lenormandi*, a remnant of the old vegetation of Melbourne Common. It was found also by Bloxam "in the bog at Foremark Park"! It does not seem to have been since seen there.

Samolus Valerandi L. Very rare. "Ponds by Swarkestone Bridge," *Bloxam*! Not since found, so far as I know.

Fraxinus excelsior L.

†*Ligustrum vulgare* L. Planted.

†*Vinca minor* L. Plantation by the roadside at Calke; well established, though no doubt originally introduced.

Erythræa Centaurium Pers. Heath End, Calke.

Menyanthes trifoliata L. Found by Mr. Bloxam in the "bog

near Foremark Park," where also I have seen it, but only very small and weakly.

Cynoglossum officinale L. Calke, but sparingly.

Symphytum officinale L. Sides of ponds and ditches.

Myosotis cæspitosa Schultz. Sides of ponds, &c. — (*M. palustris* not seen.)—*M. arvensis* Hoffm.—*M. versicolor* Reich. Calke.

Lithospermum officinale L. Calke, but sparingly.

Echium vulgare L. Found by Bloxam at Swarkestone Bridge! Can it have been truly wild?

Calystegia sepium R. Br. A troublesome garden weed.

Convolvulus arvensis L.

Solanum Dulcamara L. Calke.

**Hyoscyamus niger* L. Found by Bloxam "near the stables at Calke." Not found of late years, and probably an introduction.

Verbascum Thapsus L. Walls and roof at Calke, rare.

Linaria vulgaris Miller. Near Calke, *Bloxam*!

Scrophularia Balbisii Hornem. Sides of brooks and ponds. — *S. nodosa* L. Thickets.

Digitalis purpurea L. Heathy banks and borders of woods.

Veronica hederifolia L., *V. polita* Fries, *V. agrestis* L., *V. arvensis* L., and *V. serpyllifolia* L. Common.—*V. officinalis* L. Dry hedge-banks on the Melbourne Road. — *V. Chamædrys* L. — (*V. montana* grew just over the Leicestershire boundary, but was not seen within our limits.)—*V. Beccabunga* L. Wet places.—† *V. Buxbaumii* Ten. Cultivated ground.

Euphrasia officinalis L. Common in woody places and old heathy pastures.

Bartsia Odontites Huds. Near White Lees, Tickenhall. Not having preserved specimens, I dare not say which segregate.

(*Melampyrum pratense* L. does not seem to have been observed either by Mr. Bloxam or myself, but it can hardly be absent from the whole area.)

Rhinanthus Crista-Galli L. Pastures.

Pedicularis palustris L. was found by Bloxam "in the bog at Foremark Park"!

(No species of *Orobanche* seen.)

Lathræa Squamaria L. On the roots of laurels at Calke Abbey, appearing for a series of years. I believe it has now become extinct.

Utricularia vulgaris L. "Ponds near Swarkestone Bridge," *Bloxam*!

Verbena officinalis L. Calke, but in one spot only.

Mentha sylvestris L. — *M. hirsuta* L. — *M. rubra* Sm. Near the Pot-works at Tickenhall.—*M. arvensis* L. Calke and Repton.

Thymus Serpyllum Fr. Scarce, and not noticed by me. Mr. Bloxam's specimen is too poor for satisfactory determination, but is probably this rather than *T. Chamædrys*.

Calamintha Clinopodium Benth.—*C. officinalis* Mœnch. A small specimen of this in Mr. Bloxam's collection is marked *T. Acinos*, and is said to be from the gravel-pit at Repton Park. A specimen of *T. Acinos* from the same spot is rightly named.—*C. Acinos*

Clairv. Between Tickenhall and Repton; and near Repton Park' as above, *Bloxam*!

Nepeta Cataria L. Tickenhall.—*N. Glechoma* Benth. Common.

Scutellaria galericulata L. Side of ponds at Calke.

Prunella vulgaris L.

Stachys Betonica Benth. Woody places.—*S. palustris* L. Calke Mill.—*S. sylvatica* L.—*S. arvensis* L. Bridle road to Swarkestone, *Bloxam*!

Galeopsis Tetrahit L. Woody places.

Lamium purpureum L. — *L. hybridum* Vill. Waste ground at Tickenhall Vicarage.—*L. album* L.—*L. Galeobdolon* Crantz. Woods.

Ballota nigra L. Hedge-banks.

Teucrium Scorodonia L. Melbourne and Repton.

Ajuga reptans L.

Plantago major L.—*P. media* L.—*P. lanceolata* L.—*P. Coronopus* L. Melbourne.

Scleranthus annuus L. "Near Calke Abbey," *Bloxam*!

Chenopodium polyspermum L. Calke Village, and at Calke Mill. — *C. Vulvaria* L. (*C. olidum* Curt.). Found by Mr. Bloxam in the garden at Calke Abbey! and still lingering on the same border some twenty-five years afterwards, where Mr. Bloxam and I saw it together. I believe that it was afterwards destroyed by some alterations. — *C. album* L. — *C. rubrum* L. White Hollows and Calke Village. — *C. Bonus-Henricus* L. Near the churchyard at Tickenhall, also at Calke.

Atriplex patula and *A. angustifolia* Sm.

Polygonum Convolvulus L. Fields between Tickenhall and Repton. — *P. aviculare* L. — *P. Hydropiper* L.— *P. Persicaria* L.— *P. amphibium* L. Plentiful in one of the ponds in Calke Park. — *P. Bistorta* L. Calke.

Rumex conglomeratus Murr. — *R. sanguineus* b. *viridis* (Sibth.).— *R. obtusifolius* L. — *R. crispus* L. — *R. Hydrolapathum* Huds. Swarkestone.—*R. Acetosa* L. and *R. Acetosella* L.

Euphorbia amygdaloides L. was found by Mr. Bloxam in Calke Park! and in 1859 I was shown a solitary dwindling plant of it, which afterwards disappeared. The plant grew sparingly in Southwood, just within the Leicestershire border.— *E. Peplus* L. and *E. exigua* L. Cultivated ground.

Mercurialis perennis L.

Ulmus montana L. Apparently wild in some places, but often planted.—† *U. campestris* Sm. Fine old (planted) trees in Calke Park.

Humulus Lupulus L. Near Melbourne.

Urtica dioica L. Abundant.—*U. urens* L. Rare.

Parietaria officinalis L.

Betula alba L. Difficult to say if really wild or not.

Almus glutinosa L.

Corylus Avellana L.

Quercus Robur a. *pedunculata* Ehrh. The more common form in the district.—*Q. sessiliflora* Salisb. Scarce.

†*Fagus sylvatica* L. Only, I think, as a planted tree, not truly wild.

Salix alba L. Calke, but perhaps planted.—*S. Smithiana* Willd. Near the Heath End Lodge, Calke Park; planted.— *S. cinerea* and *S. capræa* L.

†*Populus alba* L. and *P. nigra* L. Both planted.— *P. tremula* L. Perhaps wild.

Ceratophyllum demersum L. There is a scrap in Mr. Bloxam's collection located from "Ponds in the Ticknall Lime-works," which, although labelled "*Chara vulgaris*," is evidently this plant. I did not myself meet with it, but it may well have died out.

†*Taxus baccata* L. Doubtfully wild.

†*Elodea canadensis* Mich.

Listera ovata R. Br.

Epipactis latifolia Auct. Woody places at Calke. Subject to doubt as to whether the name of *latifolia* or *media* should be employed.

Orchis Morio L. Fields above Calke Mill; and near White Lees, Tickenhall. — *O. mascula* L. Scarce. The locality in my list is just outside the boundary, but the plant can scarcely be absent from our limits. — *O. latifolia* L. One specimen seen at Calke.— *O. maculata* L.

(*Ophrys apifera* Huds. Not found by either Mr. Bloxam or myself, but I have learned on sufficient authority that it has latterly been met with in the neighbourhood.)

Habenaria viridis R. Br. "Meadows at Calke," *Bloxam*! — "*H. bifolia*" in Bloxam's collection seems rather to be *H. chlorantha* Bab.

Iris Pseudacorus L. Pond-side at Calke.

Narcissus Pseudo-narcissus L. Found by Bloxam in Calke Park! but I believe it has long been extinct.

Tamus communis L. Plantations and woody places.

Allium ursinum L. On the bank of the brook at Heath End.

Scilla nutans Sm.

Colchicum autumnale L. "Meadows at Swarkestone and Ingleby" (contiguous localities on the banks of the Trent), *Bloxam*!

Paris quadrifolia L. Brian's Copse, near Tickenhall; also found by Bloxam in Calke Park, but no longer seen there.

Juncus bufonius L. Damp places. — *J. squarrosus* L. Bog at Repton Rocks.—*J. glaucus* Ehrh.—*J. diffusus* Hoppe. Calke Park, where it was pointed out to me by the Rev. W. H. Coleman. — *J. effusus* L. — *J. conglomeratus* L. Dimminsdale, Calke.— *J. supinus* Mœnch.—*J. lamprocarpus* Ehrh. and *J. acutiflorus* Ehrh.

Luzula pilosa Willd.—*L. campestris* DC. Mr. Bloxam's specimen marked "*congesta*" is not true var. *congesta*, and belongs rather, I think, to *L. campestris.*

Typha latifolia L. Ponds at Calke.—*T. angustifolia* L. Archer's Pool, near White Hollows.

Sparganium simplex Huds. Archer's Pool. — *S. ramosum* Huds. Archer's Pool. Mr. Bloxam's specimen may perhaps be *S. neglectum* Beeby.

Arum maculatum L.

Lemna minor L. Ponds. — *L. polyrrhiza* L. Knowl Hills.—

L. trisulca L. "Near Calke Abbey," *Bloxam*! I did not meet with it.

Alisma Plantago L. Calke.

Butomus umbellatus L. Swarkestone, *Bloxam*!

Triglochin palustre L. Pond-side at Calke, *Bloxam*!

Potamogeton natans L. Archer's Pool. — *P. polygonifolius* Pour. A specimen of Mr. Bloxam's named "*natans*" is clearly this species. The bog at Repton Rocks would seem to be the most probable locality.—*P. rufescens* Schrad. Archer's Pool. Found also by Mr Bloxam in one of the Calke Ponds. — "*P. lucens* L." This is one of the segregates. "Near Calke Abbey," *Bloxam*. The specimen too imperfect to allow of certainty. I did not myself meet with it. —*P. crispus* L. — *P. densus* L. "Near Calke Abbey," *Bloxam*!—*P. zosteræfolius* Schum. Melbourne Pool. Found also by Bloxam at Swarkestone!—*P. pusillus* L. Pool between Foremark Park and Repton Waste.—*P. pectinatus* L. Melbourne Pool.

Zannichellia palustris L. Pond in Gill's Park, Tickenhall.

Eleocharis palustris R. Br.

Scirpus setaceus L. Damp spots by the Melbourne Road. — *S. lacustris* L. Melbourne Pool, and in the Trent. — *S. sylvaticus* L. By Springwood Brook, and "by the upper pond in Calke Park," *Bloxam*!

Eriophorum angustifolium Roth. "Bog at Foremark Park," *Bloxam*!

Carex pulicaris L. "Bog at Foremark Park," *Bloxam*! — *C. disticha* Huds.! (*C. intermedia* Good.). Near the upper pond at Calke, *Bloxam*. — *C. paniculata* L. Archer's Pool, and in a wet copse at Milton. — *C. vulpina* L. — *C. muricata* L. — "*C. divulsa* Good." According to Mr. Bloxam, in N. B. G., p. 640, "Common in Calke Park.' If there is no error here, the plant must, I think, have disappeared, for I have neither record nor recollection of finding it, and I can hardly think that I can have passed over, if "common," a plant with which I had been so familiar in Herefordshire. The specimen named "*divulsa*" in Mr. Bloxam's collection is, like too many others, small and unsatisfactory; it may be *C. divulsa*, but I rather incline to consider it *C. muricata* var. *pseudo-divulsa*. This specimen contrasts no doubt with that given as *C. muricata*, but then the latter is of the form which has fewer and larger perigones than usual. *C. divulsa* is, notwithstanding, a Derbyshire species, for when botanising in Dovedale last season with the Rev. A. Ley, I met with a single tuft of it in a densely wooded spot. — *C. echinata* Murr. (*C. stellulata*). Bog at Repton Rocks. — *C. remota* L. Plentiful at the lower end of the first pond in Calke Park. In N. B. G., p. 264, Mr. Bloxam records "*C. axillaris*. By the side of the ponds, Calke Abbey." There is no specimen in the collection, nor did I succeed in finding the plant. It may have disappeared through some clearing-out of the ponds or from some other cause. Mr. Bloxam gives a specimen of *C. remota*, rightly named. — *C. ovalis* Good. Near Calke.—*C. acuta* L. A specimen of Bloxam's, gathered near Swarkestone and named "*stricta*," is, I think, *C. acuta*. — *C. Goodenowii* Gay. Bog at Repton Rocks; also a taller form near

the upper pond in Calke Park. Bloxam's specimen named "*acuta*," from Archer's Pool, is, I think, this species. — *C. glauca* Murr. — *C. pilulifera* L. In one spot at Calke. — *C. præcox* Jacq. — *C. pallescens* L. "Calke," *Bloxam*! — *C. panicea* L. "Archer's Pond," *Bloxam*!—*C. strigosa* Huds. Mr. Bloxam's station, "at the bottom of Springwood, Calke Abbey," is unfortunately just over the Leicestershire boundary. The specimen is of the true plant. — *C. sylvatica* Huds.—*C. binervis* Sm. On some heathy ground near the farm called St. Bride's. — *C. flava* L. Damp places by the side of the Calke and Melbourne Road. "Bog at Foremark Park," *Bloxam*! — *C. hirta* L. Grassy places. — *C. Pseudo-cyperus* L. Found by *Mr. Bloxam*! as stated in N. B. G., at a pond-side near Calke.—*C. riparia* Curtis. About the ponds at Calke.—*C. rostrata* Stokes (*C. ampullacea* Good.). Archer's Pool. — *C. vesicaria* L. "Near Ingleby," *Bloxam*!

Phalaris arundinacea L.

Anthoxanthum odoratum L.

Alopecurus agrestis L. — *A. geniculatus* L. Tickenhall. — *A. pratensis* L.

Phleum pratense L.

Agrostis canina L. Heathy parts of Calke Park, &c.—*A. alba* L. Observing the uncertainty of the characters, especially those derived from the open or closed panicle, which are usually supposed to distinguish *A. alba* from its allies, I, whilst at Calke, collected a series of illustrative forms, which are still in my herbarium. Mr. Bagnall has kindly looked over these, and he finds amongst them his *A. nigra*, which may therefore take its place in this list. I cannot, however, say that I had perceived it to be other than one of a series of forms which show the common species of *Agrostis* to be much less sharply and clearly defined in Nature than in books. — *A. vulgaris* L. Plentiful in dry and heathy spots. — b. *pumila*. Damp spots between Calke Mill and Melbourne.

Aira caryophyllea L. *Bloxam*!—*A. præcox* L. Near Calke.

Deschampsia cæspitosa Beauv.

Holcus mollis L. and *H. lanatus* L.

Trisetum flavescens Beauv.

Avena pubescens Huds.—*A. fatua* L.

Arrhenatherum avenaceum Beauv.

Sieglingia decumbens Bernh. (*Triodia*). Bretby Park, *Bloxam*! Calke Park.

Phragmites communis Trin. *Bloxam*!

Cynosurus cristatus L. Pastures and waste places.

Koeleria cristata Pers. Very scarce. Only in one or two spots, and in small quantity, Calke.

Molinia cærulea Mœnch. With *Carex binervis* in a heathy clayey spot near St. Bride's. "Bog at Foremark Park," *Bloxam*!

Melica uniflora Ratz. "Near the Mill at Calke," *Bloxam*!

Dactylis glomerata L.

Briza media L.

Poa annua L., *P. trivialis* L., and *P. pratensis* L. — *P. nemoralis* L. *Bloxam*! — *P. compressa* L. "Swarkestone Bridge," *Bloxam*! Old walls at Repton, and on a roof at Calke.

Glyceria fluitans R. Br.—Also either *G. plicata* or *G. pedicellata*, but in the absence of specimens I will not say which.—*G. aquatica* R. Br. Pond at Calke.

Festuca rigida Kunth. (*Glyceria rigida* Smith). "Ticknall Limeworks," *Bloxam*! — *F. sciuroides* Roth. Dry banks between Calke and Melbourne, and also at Dimminsdale. — *F. ovina* L. Wall of plantation near Melbourne.—*F. rubra* L. Banks and grassy places. —*F. pratensis* Huds. and *F. loliacea* Huds. Meadows.

Bromus giganteus L. and *B. asper* L. Woody places.—*B. sterilis* L. Waste places.—*B. racemosus* "L." Damp grassy places, especially where water stands in winter.—*B. mollis* L.

Brachypodium sylvaticum Beauv. Hedge-banks and woody places.

Lolium perenne L.—†*L. italicum* Braun. Fields, lingering after having been sown as a crop.

Agropyron caninum Beauv. Banks of brook at Heath End. — *A. repens* Beauv.

Nardus stricta L. "Near Calke Abbey," *Bloxam*!

Hordeum pratense Huds. Meadows at Calke. — *H. murinum* L. About Swarkestone Bridge; also at Repton.

Pteris aquilina L. Heathy and woody places.

Lomaria spicant Desv.

Asplenium Adiantum-nigrum L.—*A. Trichomanes* L. and *A. Ruta-muraria* L. Walls at Calke.

Athyrium Filix-fœmina Roth.

Ceterach officinarum Willd. Found by Bloxam in one spot!

Scolopendrium vulgare Sym. Calke.

Lastræa Oreopteris Presl. Robinswood, near Tickenhall. — *L. Filix-mas* and *L. dilatata* Presl.

Polypodium vulgare L.

Ophioglossum vulgatum L. Meadows and pastures.

Botrychium Lunaria Sw. Very local, and in small quantity.

Equisetum maximum Lam. — *E. arvense* L. — *E. sylvaticum* L.— *E. palustre* L. — *E. limosum* L. Calke. The form with short branches.

It may be seen that I have followed the order and names of the new edition of the 'London Catalogue of Plants'; not, however, without a lively sense of the inconvenience entailed by its numerous changes, especially in the matter of sequence.

In conclusion, I must say that I hope it will not appear presumptuous on my part, or disrespectful to Mr. Bloxam's memory, to have challenged the names assigned by him to certain specimens. It must be borne in mind that the collection referred to must have been formed somewhat early in Mr. Bloxam's botanical career. There are one or two other obvious misnomers which show that Mr. Bloxam could not have been, in 1833, the accomplished and accurate botanist which we all knew him to have been after some fifteen or twenty years' further study.

NOTES ON BRITISH *CHARACEÆ* FOR 1886.

By H. and J. Groves.

The number of new county records which we have received during the past year is much smaller than that of previous years. Among plants collected by Mr. Barrington in Lough Ree is one which is much like *Chara strigosa*, but, being sterile, we cannot identify it. *Chara strigosa* is a species resembling *C. aspera*, but is "diplostichous" and monœcious; it may be distinguished from *C. polyacantha* by its smaller size, and much shorter cortical cells; it has been found in Sweden, Switzerland, Bavaria, and Austria. We have to thank our correspondents for the specimens they have forwarded.

Chara fragilis, *Desv.*—Shetland, 1886, *W. H. Beeby*.
var. *Hedwigii*.—Berks, 1886, *G. C. Druce*.
var. *delicatula*.—Donegal, 1886, *S. A. Stewart*.

C. contraria, *Kuetz.*—Suffolk W., Livermere, 1885, *W. M. Hind*, comm. *A. Bennett*; Caithness, Wester Loch, 1886, *J. Grant*, comm. *A. Bennett*.

C. tomentosa, *L.* — West Meath, Lough Ree. A new locality, connecting the old West Meath (Belvidere Lake) locality with that in the Shannon at Portumna.

C. hispida, *L.*—Berks, 1886, *G. C. Druce*; Roscommon, Lough Ree, 1886, *R. M. Barrington*. A very stout plant, approaching the form *equisetina*.

var. *rudis*.—Elgin, Loch of Cots, 1886, *H. & J. G.*; Roscommon, Lough Ree, 1886, *R. M. Barrington*.

C. vulgaris, *L.*—Glamorgan, 1886, *W. R. Linton*; Elgin, 1886, *H. & J. G.*

var. *longibracteata*. — Suffolk W., 1886, *W. M. Hind*, comm. *A. Bennett*; York N.E., 1886, *W. W. Reeves*; Down, 1886, *S. A. Stewart*.
var. *papillata*.— Somerset N., 1886, *J. W. White*, comm. *A. Bennett*; Kent W., 1886, *J. G.*
var. *melanopyrena*.—Caithness, Ben Dorrery, 1886, *A. Davidson*, comm. *A. Bennett*.

Tolypella glomerata, *Leonh.* — Sussex E., ditches near Eastbourne, 1886, *H. T. Mennell*, comm. *A. Bennett*; Glamorgan, Crymlyn Burrows, Swansea, 1886, *W. R. Linton*.

T. intricata, *Leonh.* — Surrey, Egham, 1886, *W. H. Beeby*; Herts, near Broxbourne, 1886, *T. B. Blow*.

Nitella translucens, *Ag.*—Anglesea, 1886, *J. E. Griffith*.

N. flexilis, *Ag.*—Anglesea, Bodforth Lake, 1886, *J. E. Griffith*.

N. opaca, *Ag.* — Worcester, 1886, *J. G.*; Dumfries, 1886, *A. Davidson*, comm. *A. Bennett*; Sutherland W., 1885, *F. J. Hanbury*; Shetland, 1886, *W. H. Beeby*.

THE PROGRESS OF BOTANY IN JAPAN.*

By F. V. Dickins, M.B., B.Sc., F.L.S.

Although earlier works of a botanical character existed, botanical science in the far East began with the publication of the 'Honzō Kōmoku' (Pentsao Kang-mu, or General View of the Vegetable Kingdom), by Lishih Chin, between 1573 and 1619, of which many editions have appeared both in China and in Japan. Although this work, which is rudely illustrated and consists of forty-five volumes,—the volumes of Chinese and Japanese works are more properly *livraisons*,—bears the above title, a not inconsiderable portion of it is devoted to the description of metals, stones, precious and common, and rocks. Botany was then and up to the present century regarded in both countries as a mere appendage to medicine, and the various botanical works that appeared in China up to the third decade of the present century were all constructed upon the plan of the Kōmoku, and, wholly neglecting the special morphology of plants, gave simply their obvious characters, usually with little accuracy, paying a particular attention to the characters of the root, the size, colour and firmness of which were supposed to be indications of the medical qualities of the plant.

The figures, however, were much more accurate than the descriptions, and for the general habit and character of the plant may usually be fully trusted. During the 18th century a great number of illustrated botanical works appeared. Among them, the most notable are the 'Yamato Honzō' or Japanese Flora, and the 'Kwa-i' or Collection of Flowering Plants, in eight volumes, four devoted to herbs and four to shrubs and trees. The latter work is admirably illustrated; the details of the leaves, for instance, are most accurately rendered.

In the early part of the 19th century appeared the 'Honzō kōmoku keimo' (Introduction to the System of Botany), and 'Honzō kōmoku meiso' (Botanical Nomenclature), of the celebrated Ono Ranzan, a man of great original genius and untiring industry, deservedly called the Linnæus of Dai Nippon. His pupil, Mizutani Sukeroku, continued the work of his master, and it was at the feet of the former that Itō Keisuke studied the part of the science of which, a venerable nonagenarian, he is now the acknowledged head within the bounds of the Land of the Rising Sun. The grandson of Itō Keisuke, Mr. Itō Tokutaro, is, I believe, the first Japanese to inscribe his name on the roll of the Linnean Society.

Whether the Linnean System was known to the botanists of Japan who preceded Itō Keisuke I cannot say, but no trace of such knowledge appears in any work I have met with anterior to the 'Taisei Honzō meiso,' a synopsis of the Japanese plants described by Thunberg according to the European system, published by Itō Keisuke in 1828. To Itō Keisuke then, may, without doubt be ascribed the honour of having been the first of his countrymen to

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* Communicated to the Linnean Society, Dec. 16th, 1886.

regard botany from a strictly scientific point of view, and not merely as a craft of the herbalist.

Itō Keisuke was in constant communication with Siebold during the latter's residence in Japan from 1823 to 1830, and afforded him valuable aid in the preparation of his well-known Flora. He has published numerous works on the flora of Japan, and made large collections in every part of the country, and notwithstanding his great age still maintains his interest in the science for which he did so much nearly sixty years ago. To the well-known 'Sōmoku Zusetsu,' first published in 1856, in twenty volumes, by Iinuma Yokusai, he wrote an admirable preface. A second edition of this beautifully illustrated flora was published a few years ago, a copy of which is in the possession of the Linnean Society. With the more recent publications of Itō Keisuke I am not acquainted, nor am I aware how far he has carried his great work 'Nippon shokubutsu Dsusetsu' (Illustrations and Descriptions of Japanese Plants).

The 'Honzō zufu' (Illustrated Flora of Japan), though arranged on the old plan of the 'Honzō Kōmoku,' is among the most valuable of Japanese botanical publications, by reason of its numerous coloured figures, nearly 2000 in all, of Japanese plants of nearly every division of the vegetable kingdom, of many of which no figure is to be found elsewhere. A small portion of it has been printed, but by far the greater portion of the work is still to be met with in copy only. This portion has become, in fact always was, extremely rare, and commands a high price. Even in 1873, about the time of the great revolution in Japan, I was unable to procure a copy under ninety dollars. The figures are most truthful, though unaccompanied by dissections such as we find in the 'Somoku,' but the descriptions are somewhat meagre. The 'Honzō zufu' consists of ninety-six volumes and is the work of Iwasaki Tsunemasa. It was published in 1828, at Yedo (Tokio), and in one of the prefaces an allusion is made to a work of the botanist Weinmann as having been of service to the author. Possibly the work alluded to is the 'Elenchus' of Weinmann, who sometime in the early part of the century resided, I believe, on the Pacific coast of Siberia.

CHRISTOPHER EDMUND BROOME.

Christopher Edmund Broome was born at Berkhampstead in 1812. He went to a private school first at Kensington, and afterwards, on the removal of the school, at Hounslow. He next was the pupil of a clergyman at Swaffham Prior, in Cambridgeshire, with whom he remained until he was entered at Trinity Hall, Cambridge, on October 23rd, 1832. He took his degree in January, 1836, and in April of the same year married Charlotte Norman, fourth daughter of the Rev. John Rush, Incumbent of Chelsea Old Church. After his marriage he lived first at Rudloe Cottage, near Box, then at Wraxall Lodge, near Bristol, then at

Clifton, where he remained for a few years enjoying the friendship of Thwaites, with whom he made botanical excursions. In November, 1848, he took up his abode at Elmhurst, near Bath, where he remained until his death, which took place in London on December 15th last.

Such is a brief sketch of the events of the quiet life of one of the hardest workers in Botany of our time. The facts are obtained from an address to the members of the Bath Field Club by the Rev. L. Blomefield, its President, in which the story of his life is told by one of his oldest friends, and that aspect of Broome's work and character seen by a fellow-naturalist and neighbour is most excellently displayed. Broome's botanical development seems to have begun with his residence at Swaffham Prior, in the heart of a good botanical region, where his tutor was fond of Natural History, and his near neighbour was the Rev. Mr. Blomefield, then vicar of the next parish. He must have gone to Cambridge fully prepared for the stimulus which the teaching of Henslow could not fail to have imparted. Fortunate as he thus was in his environment and its good influences on a young naturalist, there can yet be no manner of doubt that it was owing exclusively to his own power of sheer hard work that Broome rose from the ranks of dilettante botanists to be one of the most eminent and trusted mycologists of our time. It is in point of fact this remarkable and unwearied industry of a very high order which distinguishes Broome's contributions to Mycology. Though he was an acute thinker, and a man of high culture and wide sympathies, he seems to have steadily resisted all temptation to make public such speculative views of the subject of his work as were bound to occur to a thoughtful worker, and as certainly did receive grave attention from him. In judging of the man from the published work alone, striking monument though it be of faithful and diligent labour in a difficult field, it might readily enough be supposed that he had no wide sympathy with other branches of the subject. It is not necessary to point out to those who had the privilege of his friendship how much mistaken such a view would be. The present writer has recently had the opportunity of judging—from his herbarium, the library, and the scientific manuscripts—of his method of work, one had almost said his habits of thought in relation to it. Such a survey exhibits a width of sympathy with botanical research which is especially noteworthy. Over and above the care bestowed on his herbarium, the labour of accurately working out the subjects of his own research, Broome found time to follow minutely the great progress made in plant-morphology during recent years. He had an excellent and comprehensive library of natural-history books and papers; and, from his manuscript notes, and indexes to separate papers and their contents, from the most recent German paper on the morphology of Fungi downwards, one could not fail to see that his knowledge here was as thorough as his methods of systematic work. Broome's own work speaks for him far more eloquently than the words of another; but, beyond it, this other aspect of the man was known

to few, and the reason is undoubtedly to be found in the dignified modesty which marked the character of this type of what is best in a lover of Nature and a true worker in Natural History.

A list of the papers published by Broome himself and in association with the Rev. M. J. Berkeley is appended. It will be seen that he was associated with Mr. Berkeley in a great portion of his work: indeed this is so well known that it is difficult to name the one without the other. No one knows better than the distinguished mycologist still with us how hard and how honestly Broome worked for the advancement of science. His herbarium of Fungi, with part of his library, has been bequeathed to the British Muuseum, and is estimated to contain about forty thousand specimens. They are in excellent condition, and the manuscript notes and determinations, in Broome's own hand, give them a very high value.

GEORGE MURRAY.

BY MR. C. E. BROOME.

Description of a New Species of Melanogaster. (Ann. Nat. Hist. xv. 1845.)

The Fungi of Wiltshire. (Wilts Magazine, viii. 1864).

Remarks on a recently discovered Species of Myxogaster: *Trichia flagellifer*. (Brit. Assoc. Rep. xxxix. 1869.)

Scleroderma Geaster Fr., a New British Fungus. (Journ. Bot. ix. 1871.)

Remarks on some of the Fungi met with in the Neighbourhood of Bath. (Bath Nat. Hist. Club Proc. 1870, 1871, 1879, 1883.)

The Myxogastres: their Position in the Natural System. (Micr. Soc. Bath, 1873.)

BY MR. C. E. BROOME WITH REV. M. J. BERKELEY.

Notices of British Fungi. (Jardine Mag. Zool. & Bot. 1837; Ann. & Mag. Nat. Hist. 1838–1883, 26 parts, Nos. 1 to 2027.)

On some Facts tending to show the probability of the Conversion of Asci into Spores in certain Fungi. (Hook. Journ. Bot. iii. 1851.)

On some Species of the Genus *Agaricus* from Ceylon [1868]. (Linn. Soc. Trans. xxvii. 1871.)

The Fungi of Ceylon. (Linn. Soc. Journ. (Bot.) xi. 1871; xiv. 1875; xv. 1877.)

List of Fungi from Brisbane, Queensland; with Descriptions of New Species (2 parts). (Trans. Linn. Soc. ser. ii. vols. i. & ii. 1880 & 1883.)

THE NEW 'INDEX OF PLANT-NAMES.'

BY B. DAYDON JACKSON, Sec. L.S.

(Concluded from p. 71.)

IT having been brought to my notice that the article on the new "Index" of Plant-names in this Journal for February last has given rise to some misconception as to the origin of that under-

taking, and the responsibilities attached to its control, I take the earliest opportunity of communicating the following statement, supplied to me by the courtesy of Sir Joseph Hooker, through whom the work was planned, and who is responsible for the result.

"Shortly before his death, Mr. Charles Darwin informed Sir Joseph Hooker that it was his intention to devote a considerable sum of money annually for some years in aid or furtherance of some work or works of practical utilty to biological science, and to make provision in his will in the event of these not being completed during his lifetime.

"Amongst other objects connected with botanical science, Mr. Darwin regarded with especial interest the importance of a complete index to the names and authors of the genera and species of plants known to botanists, together with their native countries. Steudel's 'Nomenclator' is the only existing work of this nature, and, although now nearly half a century old, Mr. Darwin had found it of great aid in his own researches. It has been indispensable to every botanical institution, whether as a list of all known flowering plants, as an indication of their authors, or as a digest of botanical geography. No other object appeared to him to be of greater prospective advantage than this; and it was, further, one the prosecution of which he had at intervals for many years urged upon the authorities at Kew, in the hope that funds for its accomplishment might be procured from the Government or from other sources.

"The object of his munificence being settled, Mr. Darwin requested Sir Joseph Hooker to take into consideration, with the aid of the botanical staff at Kew and the late Mr. Bentham, the extent and scope of the proposed work, and to suggest the best means of having it executed. In doing this, Sir Joseph had further the advantage of the great knowledge and experience of Prof. Asa Gray, of Cambridge, U.S.A., and of Mr. John Ball, F.R.S. The general plan and scope of the work having been very carefully considered and settled in outline, it remained to find a person able and willing to undertake the laborious task of compiling the enlarged index, and to this end communications were made to Mr. B. Daydon Jackson, Secretary of the Linnean Society, whose knowledge of botanical literature suggested his being eminently qualified for the task. Happily, Mr. Jackson expressed his willingness to undertake it, provided the promised funds were sufficient, and he was thereupon requested to draw up an estimate of the probable time and funds required for the completion of the work. This he did, and his estimate having met with Mr. Darwin's approval, he was commissioned to commence his labours under the direction of Sir Joseph Hooker, who is, at Mr. Darwin's request, responsible for the work."

REMARKS ON THE NOMENCLATURE OF THE EIGHTH EDITION OF THE 'LONDON CATALOGUE.'

By B. Daydon Jackson, Sec. L.S.

In another article the progress made on the 'Index' of Plant-names has been sufficiently given for the present. I now must explain why I feel called upon to contribute anything to the discussion of the changes in the eighth edition of the 'London Catalogue of British Plants.' Last year, Mr. Frederick Hanbury asked me to look over the MS. of the new edition and mention any alterations which recent work on the 'Index' would suggest. This I did, and gave him many notes, but informed him that I could not give the time necessary to looking up each name in the Index MS.; and that my notes were only upon such items as struck me on perusal. Unfortunately I did not see it in proof, so that I had no second chance of detecting errors, particularly those of the press.

Shortly after the issue of this edition, Mr. F. C. S. Roper entered into a long correspondence with Mr. Hanbury, and with me also, as to certain names and authorities; towards the end of last year Mr. Hanbury handed me Mr. Roper's queries, where I found many which I had already answered in direct correspondence, and having no wish to go over the same ground an indefinite number of times, I desire to place the answers on record here. Some further delay would probably have occurred, had not Mr. G. C. Druce sent to the Editor an article on the same topic, whereupon I felt bound to take the matter in hand without waiting for greater leisure.

It is by no means easy to answer some of the questions propounded, as they are often quoted from foreign authors who have access to books which are scarce or wanting in this country. I will do my best to satisfy my querists, but must ask them not to be impatient if some time should elapse before the whole ground is covered. Some of the questions I shall merely copy, and leave for others to answer, as I cannot lay aside present work to hunt up and compare statements widely scattered, or to undertake a comparison of critical plants, which must be done by monographers or local botanists. These considerations apply with greater force to varieties; it is hard enough at times to run down species, where references are frequently given; but references to varieties are often omitted, and the labour of comparing European floras of, say, the last 120 years is more than I can undertake, especially as the 'Index' MS. gives no direct citations of varieties as such.

Putting aside criticisms which are specially addressed to the Editor for the next edition, I will give those remarks which seem to need attention here, with running comments.

22. *Ranunculus hederaceus* L.—Tenore published his species, *R. omoiphyllus*, in the Fl. Nap.; it figures as such in Hiern's remarks on Batrachian Ranunculi in this Journal (1871, p. 28). This opens up the old question of *Eleocharis* R. Br., or *Heleocharis*, as altered by Lestiboudois, *Aplopappus* and *Haplopappus*, and so on. There are

many foreign botanists whose native language fails to mark the strong distinction of the accents in Greek, and these may very naturally omit the rough breathing. I prefer the safe rule of copying the original, and let any blame rest upon the originator. *Roupala* of Aublet has been altered into *Rupala*, *Rhopala*, and *Ropala* by Willdenow, Schreber, and Gmelin respectively. If emendation be permitted, I cannot see where the line is to be drawn, and would therefore remain on safe ground. Printers' errors of course are to be corrected, and note taken if corrected in the Index or Errata in each volume; if the original spelling is repeated, it is confirmatory of the author's views, whilst no one would insist upon a turned or dropped letter being copied with Chinese fidelity; expansion sometimes must take place, as will be shown hereafter in some of Linnæus's names.

32. *R. sardous* Crantz, should not be printed *Sardous*, although founded on the *Ranunculus secundus vel Sardous* of Cordus.

35. *R. flabellatus* var. *europæus* (*europæa* Nyman).— See Dr. Asa Gray's recent remarks on the necessity of varietal names following the gender of the genus.

52. *Nymphæa alba* var. *minor* Syme (1863).—Antedated by DC. Syst. ii. 56 (1821). A case showing how a later writer may fail to acknowledge the work of his predecessors.

62. *Chelidonium majus* var. *laciniatum* (Mill.). — Published as a species by Miller, Gard. Dict. ed. 8.

63. *Corydalis bulbosa* DC. Fl. Franç. iv. 637 (1805), antedates *C. solida* Sw. in Sv. Bot. viii. (1819). Nyman's date of 1821 refers to DC. Systema. *C. digitata* Pers. Syn. ii. (1807) must yield to the first named.

65. *C. claviculata* DC. Fl. Franç. iv. 658 (1805) precedes Pers. Syn. ii. 270 (1807).

Mathiola R. Br. — Mr. Roper writes strongly for spelling this *Matthiola*, alleging that Linnæus in framing a genus to commemorate to Mattioli used that form. I do not see how a genus which was founded on a drawing by Plumier, and now admittedly sunk in *Guettarda*, in *Rubiaceæ*, can be brought into the debate on a cruciferous plant; a further argument is used that Allioni, as an Italian, must know how his countryman's name should be spelled, and he used the double *t*. The weakness of this plea will be seen in a moment; if Allioni were a purist he would contend for the vernacular, which has no *h* in it at all; this he does not do: the argument therefore falls. But let us see how it would affect other names: the founder of the Linnean Society established a genus to bear the name of his friend, afterwards Bishop of Carlisle, styling it *Goodenia*, which he afterwards owned might have been preferably *Goodenovia*; Sir J. E. Smith, as an Englishman, might be supposed to know how his countryman's name should be spelled, yet he deliberately chose to discard the spelling Goodenough. A multitude of similar instances might be adduced—*Brunonia* from Brown; *Gundelia* from Gundelsheimer; *Bea*, *Boea*, and *Baea* from Le Beau; *Desfontainea*, *Fontainesia*, and *Louichea* from René Louiche Desfontaines.

96. *Cardamine bulbifera* R. Br. in Ait. Hort. Kew. ed. ii. iv. 102 (181) must supersede "Syme";* the latter gave no indication in Eng. Bot. ed. iii. i. 156, of previous publication; he seemed therefore to be following Bentham and Hooker in reducing *Dentaria* to *Cardamine*. Mr. Roper's remark, "also *C. flexuosa* Willd. and *C. sylvatica* F. Dan. 1761, &c., all older than Syme," has of course nothing to do with the present species.

98. *Alyssum calycinum* Linn. Sp. Pl. ed. ii. 908, must stand as given; it is true it has a reference to Jacq. Stirp. Vindob. p. 114 (1762), but if Mr. Druce had been able to refer to the latter he would have seen that there is no mention of *A. calycinum*, but a different diagnosis of *A. alyssoides*, the two other *Alyssa* being *montanum* and *incanum*.

105. *Erophila præcox* DC. Syst. ii. 359, is the publication of the species; Reichenbach's date is nine years later.

109. *Cochlearia anglica* Linn. Syst. ed. 10, 1128.—Referring to this plant, Mr. Druce suggested that an early reference may be found in the thesis read by Grufberg under the presidency of Linnæus in 1754. This opens up an interesting question: Can this thesis be quoted, as it appears at first sight a list of bare names, with references to the Dillenian edition of Ray's Synopsis? I have carefully gone through it, name by name, and I think we are bound to quote it, as the references given to page and paragraph are enough to determine the plant intended. Excluding names now sunk, and a few slips, such as *Borago hortensis* for *B. officinalis*, we have eighteen names left in the form in which it was published in the fourth volume of the 'Amœnitates' at Stockholm in November, 1759. The original edition (1754) has fewer names than in the enlarged version in the 'Amœnitates,' and some in the latter were previously published by Linnæus in other works.

The first edition of the 'Species Plantarum,' issued in May and August of the year 1753. Between that date and the first volume of the second edition in September, 1762, the following works were issued:—

Diss. herb. amboinense. May, 1754.
Diss. Fl. anglica, resp. Grufberg. Nov., 1754.
Diss. Cent. plant. 1ma. Feb., 1755.
Flora Suecica, ed. 2. Oct., 1755.
Diss. Fl. Palaest. March, 1756.
Diss. Cent. plant. 2da. June, 1756.
Am. Acad., vol. iii. Sept., 1756.
Hasselquists's Fl. Palæst. June, 1757.
Loefling's Iter. Hisp. The end of 1758.
Syst. Naturæ, ed. 10, vol. ii. May–June, 1759.
Burman (N. L.), Diss. de Geraniis. Aug., 1759.
Am. Acad., vol. iv. Nov., 1759.
Diss. Pug. Jamaic. Dec., 1759.
Diss. Pl. Afr. rar. May, 1760.

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* Var. *Hortii* Syme was published in Bot. Exch. Club Rept. 1872-4, p. 9 (1875), and is therefore not noticed in Eng. Bot. ed. iii. (1863).

Jacquin, Pl. Amer. 1760.
Am. Acad., vol. v. Sept., 1760.
Nov. floræ Suecicæ (2 pp. appended to Fauna Suecica, ed. 2, 1761).
Diss. de Alströmeria. June, 1762.
Gouan, Hort. Monosp. Jan., 1762.
Hudson, Fl. Anglica. June (?), 1762.
Linn., Sp. Pl., ed. 2, vol. i. Sept., 1762.

Many of the names in these treatises do not affect us; I shall therefore only cite them when they touch British Botany, the matter in hand.

112. *Sisymbrium Thaliana* Hook. Brit. Fl. ed. 1, 306 (1830), and *S. thalianum* Gaud. Fl. Helv. iv. 348 (1829), must yield to *S. Thalianum* Gay in Ann. Sci. Nat. vii. (1826) 399.

116. *S. pannonicum* Jacq. Coll. i. 70 (1786), Ic. rar. t. 123 (1781–86) may be *S. altissimum* Linn. Sp. Pl. ed. 2. Crantz published his *S. Sinapistrum* in the second edition of 'Stirpium Austriacarum,' p. 59, in 1769; there is no mention of the plant in the first edition, 1762, which he entitled 'Stirpium Austriarum.'

120. *Erysimum perfoliatum* Crantz, Stirp. Austr. i. ed. 2 (1769). —How Brown's name *orientale* came to be accepted is surprising.

121. *Camelina sativa* var. *fœtida* (Fr.). — Described as a species by Fries, Mant. iii.

143. *Lepidium Smithii* var. *alatostyla* Townsend. — Syme suggests altering the varietal name to *alatistylatum*. The dangerous plea for alteration again brought forward; if allowed here, what can be interposed as a barrier in any other case?

165. *Viola odorata* b. *alba* Auct.—Not Besser's plant.

181. *Polygala amara* Linn. Syst. ed. 10, 1154 (1759).—Earlier than any work of Jacquin's.

203. *Cucubalus baccifer* Linn. Sp. Pl. ed. i.—*Baccifera* is a later form, and further removed from classic usage; common sense and scholarship in this case are in accord. Fastidious critics now write the adjectives *acer*, *paluster*, *silvester*, and the like, instead of the usual *acris*, *palustris*, *sylvestris*; *cæspitosus* and *cespitosus*, *cæruleus*, and *caruleus* are also samples of variation. If the grand principle of following the original author be rigidly observed, no harm will result from writers who claim a greater precision in classic usage than classic writers warrant.

209. *Lychnis Githago* Scop. Fl. Carn. ed. 2, 310 (1772).—Earlier than Lam. Encyc. iii. 642 (1789), which is quoted in DC. Prod. i. 387.

217. *Cerastium alpinum* var. *Edmonstoni* H. C. Wats. — The name first appeared in Lond. Cat. ed. 1, p. 2 (1844). Watson afterwards commented on it in the 'Phytologist,' ii. (1845), 93; it will be found in Bab. Man. ed. 2, p. 56; therefore to cite the fifth edition of that work as the place of publication, as suggested by one of my correspondents, would be absurd.

226. *Stellaria palustris* Retz. Prod. ed. 2, p. 106 (1795), antedates *S. glauca* With. Bot. Arr. ed. 3, vol. iii. 420 (1798), which name does not figure in the two previous editions.

230. *Arenaria sulcata* Schleich. Mag. Naturf. Ges. (1816),

is clearly older than Wormskiold's *A. hirta* in Fl. Dan. t. 1646 (1819). Mr. Roper has taken the date of the first volume (1761), instead of the volume which had the name in question.

248–251. *Lepigonum* versus *Spergularia*. — *Lepigonum* was published by Fries in his scarce 'Flora Hallandica,' p. 76 (1818), two species being named; in the next year (1819) the brothers Presl published *Spergularia* as a genus in their 'Flora Cechica,' p. 94. Before this, the name was used sectionally as in Persoon, Syn. i. 504, 505, where all the species described in this section are numbered as *Arenaria*, although with the remark, "Hæc species (*rubra*, *media*, *canadensis*, *purpurea*) aut Spergulis . . . . associandæ, aut sub peculiari genera . . . . ab Arenariis separandæ, cum quibus seriem haud naturalem efficiunt," yet Persoon, it is evident, did not venture to propose the section as of generic rank; though suggesting these species may belong to *Spergula* or possibly a new genus.

254. *Claytonia perfoliata* Donn, Hort. Cantab. 25 (1796).—Strictly speaking, a naked name, but so distinctive that it may be considered truly diagnostic; if a fuller description be wanted, refer to Willd. Sp. Pl. i. 1186. The figure in Bot. Mag. t. 1336, did not appear till November, 1810.

255. *Montia fontana* Linn., *α. repens* and *β. erecta*, both of Pers. Syn. i. 111 (1805).—Mr. Druce points out that these varietal names must supersede C. C. Gmelin's specific names, reduced to varietal, of *Montia minor* and *M. rivularis*, Fl. Bad. i. 301, 302 respectively (1806).

(To be continued.)

SHORT NOTES.

On the Position of the Raphe in Endodesmia. — *Hypericaceæ* being situated on the confines of *Guttiferæ*, *Ternstræmiaceæ* and *Saurageſiaceæ* on the one hand, and *Droseraceæ* and *Ranunculaceæ* on the other, it becomes a question of some interest to learn the position of the raphe in *Endodesmia*, the only genus having a single pendulous anatropal ovule. Having obtained a branchlet of five flowers from the Kew Herbarium, from the specimens collected by Mr. Mann in Africa, there being but one species, *E. calophylloides*, it was found, after careful examination, that it is dorsal, the rather large foramen being close up under the funiculus. *Hypericaceæ* therefore in that character approach *Droseraceæ* (among which *Roridula* has a single pendulous ovule with the raphe dorsal) and also *Ranunculaceæ*. It being the only genus of the order which has a single carpel, it may be interesting to add that the single carpel of which the ovary is composed was lateral in all the five flowers, which serves the purpose of proving that it it is not always either anterior or posterior; and in so far it agrees with the *Guttiferæ* and *Dipterocarpeæ*, in which its position is variable, but perhaps more frequently anterior than posterior.—B. Clarke.

Change of Colour in Anemone nemorosa, &c.—The var. *cærulea* used to occur (1870) plentifully in Hurst Wood, Tunbridge Wells. Plants with white, pink, and perfectly blue flowers grew in company: there was no approach to separation even into unicoloured groups. The deepest pink I ever met with was in specimens gathered upon the greensand above Sevenoaks Railway Station: white specimens were near at hand, but no blue ones. I have frequently found *Oxalis Acetosella* of a rich pink colour; this does, at any rate usually, appear in patches of the same hue; but I never traced any variation in soil which accounted for the differences between the several patches. The usual white or pale lilac, and the pink flowers, as well as intermediates, appeared equally (Shropshire and North Wales) upon carboniferous limestone and Silurian shales.—William Whitwell.

Note on Ranunculus bulbosus. — The root-characters of this plant present some interesting features, recalling in some sort the mode in which the growth of the common species of *Orchis* is continued from year to year. The "enlarged base of the stem" is strictly an annual production, persisting as a tuber only until the plant of the following year is matured. In February or March, when the root-leaves are fairly developed, it may be seen that the new plant of the year is not a direct continuation of the old plant, but is produced from a bud at the apex of the old tuber; the latter is now half absorbed, but still adheres firmly to the new plant. At this time the stem of the new plant is not at all enlarged at its base. At flowering time the base of the new stem has become considerably enlarged, while the old tuber has almost disappeared, a mere husk remaining; it may, however, still be found if the plant be carefully dug up. Attention was first directed to this point early last year, when making records of common Surrey plants; wishing to make certain of a particular record of *R. bulbosus*, a plant was dug up, and the old tuber found as described. I have watched the gradual decay of the tuber up to flowering time, but omitted to continue the observations so as to obtain the isolated tubers after the decay of the plant.—W. H. Beeby.

NOTICES OF BOOKS.

Beitrage zur Kenntniss der Nectarien und Biologie der Bluthen. By Dr. S. Stadler. Pp. 88, pl. 8. Berlin. Price 8 *marks*.

This is a very interesting series of studies of the structure and history of seventeen species of plants, together with remarks on their fertilisation. The plants selected are *Lathræa Squamaria*, *Impatiens Roylei*, *Cyrtanthus Pohliana*, *Dierilla rosea*, *Saxifraga mutata*, *Passiflora cærulea* and *P. cæruleata*, *Asclepias Cornuti*, *Pinguicula alpina*, *Agave Jacquiniana*, *Kniphofia aloides*, *Lilium auratum* and *L. umbellatum*, *Galanthus nivalis*, *Melittis Melissophyllum*, *Cydonia japonica*, and *Oenothera Lamarkiana*. The last three species, the author points out, must be added to the small list of

plants possessing hispid nectaries. The origin and course of the fibrovascular bundles in the nectary, a point hitherto too much neglected, receives careful consideration, as do the chemical reactions of the cell-contents of the nectary tissue. The methods of secretion are divided into four classes:—(*a*) Through uncuticularised tissue, as in *Agave*; (*b*) through stomata, the commonest way, as in *Melittis*; (*c*) through cuticularised tissue without; and (*d*) with upheaving of the cuticle, as in *Lilium* and *Diervilla* respectively. Dr. Stadler has even something new to say about *Asclepias Cornuti*, a plant whose structure has been so carefully studied by Hildebrand, Müller, and Corry. It is shown to have two kinds of nectaries, the object and histology of which is discussed and described. The paper is well illustrated by eight lithographed plates of the anatomy and histology of the plants described.

H. N. R.

Articles in Journals.

Botaniska Notiser (häft. 2). — T. Nattsén, 'Forteckning öfver Fanerogamer och Ormbunkar, funna inom Alingsås pastorat.'— G. Lagerheim, 'Ueber einige auf *Rubus arcticus* vorkommende parasitische Pilze.' — A. L. Grönvall, 'Treme för svenska floram nya *Orthotricha*.' — C. J. Lindeberg, 'Genmåle.' — F. Areschoug, 'Svar på lektor C. J. Lindeberg's 'Genmåle.'' — K. F. Thedenius, ***Ruppia intermedia***, sp. n.

Bot. Centralblatt (No. 15). — K. v. Meinshausen, '*Carex livida*.' — (No. 16). R. Keller, 'Ueber Bildungsabsweichungen in den Blütenblattkreisen von *Linaria spuria*' (1 plate). — (Nos. 17, 18). S. Gheorgieff, 'Beitrag zur vergleichenden Anatomie der Chenopodiaceen.'—(No. 18). M. Kronfeld, 'Ueber Raphiden bei Typha.'

Bot. Zeitung (Nos. 13–16). — F. Oltmanns, 'Ueber die Entwickelung der Perithecien in der Gattung *Chætomium*' (1 tab.).— (No. 13). N. Pringsheim, 'Abwehr gegen Abwehr.' — (No. 14). F. v. Mueller, *Pandanus Solms-Laubachii*, n. sp. — (Nos. 15, 16). H. Hoffmann, 'Culturversuche über Variation.'

Bull. Soc. Bot. France (xxxiv. Comptes Rendus 1. Ap. 1).— P. Van Tieghem, 'Sur la formation quadrisériée des radicelles dans les racines binaires des Phanérogames.'— Id., 'Disposition quadrisériée des bourgeons.' — A. M. Hue, 'Lichenes yunnanenses.' — J. Vallot, 'Influence chimique du sol sur la végétation des sommets des Alpes.' — J. Costantin, 'Sur l'*Amblyosporium bicollum*, sp. n., et le *Mucor plasmaticus*' (1 plate). — H. Leconte, 'Note sur le *Mycorhiza*.'—P. Duchartre, 'Sur deux Roses prolifères.' — G. Camus, '*Teucrium Scordium* et ses variétés.' — C. Richon, '*Hymenogaster leptoniæsporus* et *Capronia Juniperi*,' spp. nn. (1 plate).—A. Deflers, 'Nouvelles Contributions à la Flore d'Aden.'

Bull. Torrey Bot. Club (April). — E. A. Schultze, 'Descriptive List of Staten Island Diatoms' (1 plate). — A. F. Foerste, '*Sanguinaria canadensis*' (1 plate).

Gardeners' Chronicle (Ap. 2–23). — W. B. Hemsley, 'The Botanical Magazine.'—F. W. Burbidge, 'Leaf-twisting of *Narcissus*.'

—(Ap. 9). *Nephthytis picturata* N. E. Br., *Pleurothallis insignis* Rolfe, spp. nn.— *Nephrolepis rufescens* var. (fig. 91).—W. G. Smith, 'The Gardenia-root Disease' (figs. 93–96).—(Ap. 16). *Galeandra flaveola* Rchb. f., n. sp.—(Ap. 23). *Agave Morrisii* Baker (fig. 105), *Rhododendron Lochæ* F. v. M., *Adiantum cyclosorum* Moore, spp. nn.

Journal de Botanique (Nos. 4, 5). — L. Dufour, 'Les récents travaux sur la tissu assimilateur des plantes.'— P. Hariot, 'Algues magellaniques nouvelles' (*Siphonocladus volutiœula*, *Ectocarpus Constanciæ*, *Sphacelaria Borneti*, *Ceramium Dozei*, *Callophyllis atrosanguinea*, *Hildebrandtia Le Cammelieri*, spp. nn.).—(No. 4). J. Vallot, 'Florule du Panthéon.' — H. Douliot, 'Études des méristèmes terminaux.'

Midland Naturalist.—W. Mathews, 'Flora of Worcestershire.'

Nuovo Giornale Bot. Ital. (April).—L. Savastano, 'Esperimenti sul parasitismo dell' *Agaricus melleus*.' — Id., 'Esperimenti sui rapporti tra i fatti traumatici e la gommosi.' — E. Tanfani, *Tecoma Ricasoliana*, sp. n. (1 plate).—G. B. de Toni & D. Levi, 'Spigolature per la ficologia veneta.' — H. Groves, 'Flora di terra d'Otranto' (*Anthemis hydruntina*, sp. n.: 5 plates).

Scottish Naturalist (April). — F. B. White, 'Forms of *Caltha palustris*.'—A. Bennett, 'Records of Scotch Plants for 1886.'—J. W. H. Trail, 'Influence of Cryptogams on Mankind.' — Id., 'Revision of Scotch *Peronosporeæ*.'— Id., 'New Scotch Microfungi' (many new species). — H. N. Dixon, '*Webera cucullata* in Ross.' —Archibald Gray, '*Arenaria norvegica* in Sutherland.'

LINNEAN SOCIETY OF LONDON.

Feb. 17*th*, 1887. — William Carruthers, F.R.S., President, in the chair. — The Rev. Andrew Johnson exhibited drawings of an abnormal *Begonia Veitchii*, grown by him the preceding autumn. The peculiarity consisted in the flower having a single large flask-shaped ovarian-like organ (?) placed centrally, and surmounted by a single, simple straight style, thus, though doubtless a male, indicating a hermaphrodite condition, while presenting resemblances to the normal female organs of *Laurus nobilis*. — Mr. E. Morell Holmes exhibited some irregularly-developed lemons, in which the carpels were more or less separated at the apex; the arrest of the normal union of the carpel being attributed to the bite of an insect in the early stage of the growth of the fruit. — There was exhibited for Mr. J. G. Otto Tepper a new *Stylidium*, *S. Tepperiana* F. Muell., collected by Mr. Tepper Nov. 13th, 1886, on Mount Taylor, Kangaroo Island, Victoria, Australia. It was found in the interstices of a tertiary limestone; other trees which grew in the neighbourhood were stunted Eucalypts, Hakeas, and an Acacia somewhat resembling *A. pycnantha*. — A dried specimen of *Primula imperialis* Jungh., collected by Dr. Sydney Hickson in Java, was exhibited from the Royal Gardens, Kew. This species is a giant form of

Primula, being over three feet in height. Plants of this Himalayan and Malayan species are now under cultivation at Kew, and form an interesting addition to this popular group of garden plants.—Mr. George Maw showed two Narcissi, both of which have been known under the name of *cernuus*. The white daffodil or ajax, discovered by Mr. Buxton at a height of 7000 ft. in a valley of the Spanish Pyrenees, is of interest because it is the only white daffodil now known in a wild habitat; though four, more or less distinct, viz., *moschatus*, *cernuus*, *albicans*, and *tortuosus*, were known to the earlier botanists probably as early as 1600. It is open to question whether the white daffodil exhibited should be called *cernuus* or *moschatus*. Linnæus's name of *moschatus* was applied to a white daffodil from the Pyrenees. The name *cernuus* was applied to an ajax or daffodil, and used by Roth, Schultes, and Haworth in 1817, 1831, and 1835; but Salisbury, in 1816, applied the name *cernuus* to *Narcissus triandrus* Linn., or a variety of it. Dr. Willkomm, in his 'Illustrationes Floræ Hispanicæ,' has recently described a third species, under the name of *cernuus*. The specimen exhibited was flowered by the Rev. C. Wolley Dod from bulbs collected by Dr. Henriques, of Coimbra, in Serra d'Estrella, Portugal. It is a very diminutive orange-coloured species, with suddenly reflexed segments barely half an inch in length, and with a corona barely half an inch long. It is allied to *triandrus*, but is evidently distinct from the yellow forms of that species, and may be identical with a plant collected by Blanco at Puente Horida (? Fuente Torrido), in the province of Jaen, a single specimen of which exists in the British Museum.—Sir John Lubbock read the second part of his "Phytological Observations, and on the Leaf of *Liriodendron*." In *Œnothera bistorta* the seed-leaves are linear, terminating in a large round expansion. There was nothing to account for it in the seed, nor does it appear to be of any advantage to the young plant. On watching the growth, however, and comparing it with other allied species, the explanation appears to be as follows:—In *Œnothera bistorta* the cotyledons are at first round, but a growth takes place at the base of the cotyledon, which in each species closely resembles that of the subsequent leaves. Those of *Œ. bistorta* are long and narrow, hence the peculiar form of this species. In allied species the seed-leaves consist of two parts, a terminal portion, the true or original cotyledon, and a subsequent growth resembling in each species the true leaves. Sir John referred to seed-leaves in which the stalks were connate, instancing the case of *Smyrnium*, wherein the union seems clearly advantageous as giving additional strength. He described some other characters in various species (*Plantago*, *Tilia*, *Heliophila*, *Cardamine*, &c.), suggesting the causes to which they were due. Concerning the tulip tree (*Liriodendron*), he had long been puzzled by the peculiar saddle-shape of the leaves; and after various other suggestions, which had proved untenable, he described the structure of the bud and the manner in which the young leaves were packed in it, and showed that the peculiar manner in which the young leaves are arranged satisfactorily accounts for the well-known and very remarkable form of the leaf.

TWO NEW BRITISH ECTOCARPI.

By E. M. Holmes, F.L.S.

(Plate 274).

The two species of this very difficult genus, which are here noticed, have been selected for illustration simply because figures of them do not appear to have been hitherto published. The additions that have been made to the British species of the genus during the last few years include eight or nine others, but of all of these illustrations have been given in various algological works.

Ectocarpus simplex Crouan.—This is described by Crouan as growing in tufts of about a centimetre in extent, furnished with few alternate ramuli, which, however, are sometimes opposite or on the same side, the articulation being one-half to three times as long as broad, but those bearing sporangia are as long as broad. The sporangia are *conical*, *obtuse*, stalked, and *scattered* over the frond.*

Syn. *Ectocarpus Codii* Lloyd, Alg. Ouest.

Exsicc. Desmaz. 1806; Crouan, Alg. Mar. Finist. 13; Le Jolis, Alg. Cherb. 228; Lloyd, Alg. Ouest. 332; Holmes, Alg. Brit. rar. 8.

This species I have only found growing on *Codium tomentosum*, in small shaded pools at mid-tide or close to low-water mark. As yet I have met with it in June only at the Lizard, and Peverel Point, Swanage, but it will doubtless be found elsewhere. The sporangia vary considerably in shape, from conical to nearly ovate, but differ from those of the next species in being scattered all over the frond, instead of confined to the lower portion, and in being always stalked. The tufts are of a dark brown colour, and appear to be furnished with rooting-threads, which enter the fronds of the *Codium*.

Ectocarpus insignis Crouan.—The description given by Crouan is as follows:—Frond branching from the base, ramuli subhorizontal, divaricate, alternate or opposite, the *lower third* of the tuft being covered with numerous ovoid *sessile* sporangia, which give to this portion of the plant a darker colour. The lower joints are two to four times, those of the middle once or twice, and those of the summit four to six times, as long as broad.

Exsicc. Crn. Alg. Mar. Finist. 14; Lloyd, Alg. Ouest. 288; Holmes, Alg. Brit. rar. 34.

This is one of the most easily recognised of the Ectocarpi, and, considering the abundance with which it occurs on the British shores, it is remarkable that it has been so long overlooked. It grows parasitically on several Algæ, and varies considerably in size from a quarter of an inch to one inch or more in height, and from the size of a pea to tufts half an inch or more in diameter. The tufts are usually of a pale dirty brown colour. On *Chondria*

* Fig. 1*c* shows the extent of variation in shape, when compared with the sporangia shown on 1*b*.

dasyphylla, on which I first met with it at Bognor, it grew scattered over the branches on small tufts. On *Codium adhærens*, on which it occurred abundantly at Durlestone Head, near Swanage, it was scattered to the extent of some hundreds of tufts over about a square yard of the *Codium*.

The great abundance of the sporangia on the lower part of the plant gives a peculiar hardness and firmness to this part of the plant, and in consequence the plant can easily be recognised by the touch. The upper portion, being less branched and consisting of more delicate ramuli, soon becomes torn away, leaving firm little tufts, almost globular in shape, attached to the *Codium*. The sporangia, when mature, become of a dark brown colour, and contrast strongly with the pale colour of the threads, so that they are easily seen under a good lens.

The plant was first found by Mr. R. V. Tellam at Falmouth, growing on *Codium adhærens*. It appears to be in its best condition in April and September. Although the specimens met with in June are the largest, from that month to August they become injured by exposure to the heat of summer, and are more or less decayed. Besides the above localities I have also met with it at Weymouth. The distinctive features of the plant are the sessile, almost quadrate, sporangia, and the densely branched, almost globular, base of the plant, with the numerous sporangia confined to the lower joints. In both the above species I have only seen the plurilocular sporangia. It has been found by Crouan on *Cutleria multifida*; by Le Jolis on *Zostera* and tubes of *Amphitrite*; and especially on the decayed tips of *Laminaria Phyllitis*.

Explanation of Plate 274.—1. *Ectocarpus insignis*. 1*a*, frond, nat. size; 1*b*, ditto, magnified; 1*c*, plurilocular sporangium, magnified. — 2. *Ectocarpus simplex*. 2*a*, tuft, natural size, parasitical on *Codium tomentosum*; 2*b*, ditto, magnified; 2*c*, plurilocular sporangium, magnified.

NOTE ON A COLLECTION OF FERNS FROM QUEENSLAND.

By the Baron F. von Mueller, and J. G. Baker, F.R.S.

The following Ferns formed part of a very interesting collection recently made high up in the Bellenden Ker range, in Queensland, by Messrs. Sayer and Davidson. As they struck a zone yielding *Rhododendron* and *Vaccinium*, this expedition has made an important addition to our knowledge of the Australian flora, so that it seems best to place on record the ferns of the collection at once.

Trichomanes parvulum Poir.? — Bellenden Ker Mountains, alt. 5200 ft. Widely spread through Tropical Asia and Polynesia.

Davallia tripinnata F. M.— Bellenden Ker range, alt. 5200 ft. A very rare endemic Queensland species, only gathered once before.

Polypodium australe Mett. — Bellenden Ker range, alt. 5200 ft.

Widely spread in Australia, New Zealand, South Temperate America, &c.

139*. **Polypodium** (EUPOLYPODIUM) **fuscopilosum,** n. sp. — Rootstock short-creeping, hypogœous. Fronds contiguous, nearly sessile, lanceolate, simply pinnate, moderately firm in texture, erect, elastic, green and copiously clothed with short brown hairs on both surfaces, **4–5 in. long, ½–¾ in. broad at the middle,** narrowed gradually to both ends. Pinnæ very numerous, broadly adnate at the base, contiguous, entire, lanceolate, subobtuse, the central ones ¼–⅓ in. long, 1-12th to 1-8th in. broad. Veins distinctly visible; costa zigzag; veinlets few, erecto-patent, simple. Sori globose, medial, slightly immersed. — Bellenden Ker range, 3000–4000 ft. Intermediate between *P. parvulum* Bory and *P. fuscatum* Blume.

Polypodium (*Pleuridium*) *simplicissimum* F. M. — Bellenden Ker range, alt. 5200 ft. An endemic Queensland species.

72*. **Gymnogramme** (SELLIGUEA) **Sayeri,** n. sp. — Rhizome epigœous, wide-creeping, ⅙ in. diam.; paleæ dense, ascending, lanceolate, membranous, dull brown. Fronds spaced out on the rhizome, erect; stipes erect, naked, 1–1½ in. long. Lamina lanceolate, simple or casually forked, membranous, green and glabrous on both surfaces, 6–8 in. long, an inch broad at the middle, narrowed gradually to the apex and stipe. Veins distinct, anastomosing in copious large hexagonal areolæ, with forked free included veinlets. Sori linear or linear-oblong, medial, erecto-patent, ¼–¼ in. long. — Bellenden Ker range, alt, 5200 ft. Allied to *G. membranacea* Hook. and the Chinese *G. Wrightii.*

Vittaria falcata Fée. — Mount Bellenden Ker, alt. 5200 ft. A Malayan species not previously known in Australia.

NOTES ON PONDWEEDS.

By ALFRED FRYER.

5. POTAMOGETON HETEROPHYLLUS Schreb. Stem slender, much branched at thé base; *lower branches spreading, barren, permanently submerged;* fruiting branches usually ascending to the surface by a naked length of stem, at the end of which the flower-spikes are supported by floating leaves and cymbiform stipules, or with the upper part of the fertile branches abundantly branched and floating near the surface. Lower leaves submerged, *undulate, entire, not serrate nor denticulate,* flat and ascending, or folded and recurved, *sessile, but not amplexicaul,* narrow, strap-shaped, elliptical or lanceolate, acuminate; lowest rarely reduced to a midrib; uppermost alternate or opposite, *long-stalked; petiole exceeding the lamina,* flat, entire, membranous and reticulated, or more frequently coriaceous and opaque, elliptical, oblong, obovate or rotundate; lamina usually abruptly contracted into the petiole, sometimes decurrent. Stipules blunt, herbaceous or scarious, small and clasping, or larger, loose, and spreading; uppermost cymbiform.

Peduncles shorter than the leaves at their base, often produced in clusters, stout, swollen upwards, *regularly curved from the base, terminal, or lateral only from the fertile branchlets lengthening and flowering;* spike short, dense, cylindrical, 1–1½ in. long. Drupelets small, flattened at the sides; dorsal margin blunt, with prominent keel and ridges, or acutely keeled; upper margin straight, terminated by the short beak: *variable*. Colour of the whole plant, green or olive-green.

P. heterophyllus is usually a much more slender plant, with much smaller leaves than *P. Zizii*, from which it may be readily distinguished by its regularly curved peduncles, which, together with the fruiting spikes, are shorter than the leaves from whence they spring. In *P. Zizii* the peduncles are usually straight for some part of their length, and, together with the fruiting spike, are much longer than the subtending leaves. Again, when coriaceous floating leaves are present, the two species are still more easily separated. In *P. heterophyllus* the petiole of these leaves is almost invariably longer than the lamina, whilst in *P. Zizii* it is much shorter, or rarely equalling the lamina. Out of many hundreds of leaves carefully examined, I have met with only one leaf of *P. Zizii* in which the petiole is longer than the lamina. It will hardly be necessary to do more than remind the student that in these particulars the two species under consideration are liable to some degree of variation, the result of unusual or irregular conditions of growth—accidental states which a little experience will soon enable the careful observer to detect and explain. In *P. heterophyllus* the peduncles are usually terminal, or only become lateral by the continued growth and flowering of the fertile branchlets. In *P. Zizii*, on the other hand, they become lateral by a barren branchlet springing from and growing beyond the fertile branchlet.

P. heterophyllus is certainly the most variable of our British pondweeds, and the difference between early and later stages of growth, and between upper and lower leaves of the same individual is often so great that the uninitiated might readily mistake these stages for different species. It will be well for the student to bear in mind that under certain conditions the whole plant develops throughout its entire existence a uniform growth, resembling that of the lower branches, especially when growing in deeper or colder water than usual; or, perhaps, when growing in a more northern latitude; and that the reverse is the case in shallow or warm waters. Many continental authors, probably founding upon some such local races, have divided *P. heterophyllus* into two sections, which, however, are not sufficiently well represented in the fens to be touched upon by me with any advantage. But we have some curious and really permanent varieties, which will probably require specific segregation. These are in the hands of my friend Mr. Bennett, whose critical ability and accurate knowledge of this difficult race of plants are alike unrivalled.

In the third edition of 'English Botany,' vol. ix., p. 36, Dr. Boswell (Syme) says that the floating coriaceous leaves of *P. heterophyllus* are "quite flat before they have attained their

full size, while in *P. polygonifolius* they remain rolled-up in a funnel until they are almost full-grown." This is a distinction I have been unable to verify. As far as I have been able to observe, all the coriaceous leaves produced by pondweeds remained rolled-up until nearly full-grown; but after expansion the petiole often lengthens considerably. This point is one well worth investigation, and the attention of observers is especially invited to it.

The position of *P. heterophyllus* in the *lucens* group is between *P. Zizii* and *P. nitens*, and it seems to have about equal specific value with those forms: passing through *P. nitens* and *P. decipiens* to *P. lucens* on the one hand, and through *P. Zizii* and *P. coriaceus* to *P. lucens* on the other hand. It would, however, be premature to discuss these alliances until the numerous varietal forms are more fully examined and understood.

NOTES ON SOME PLANTS OF NORTHERN SCOTLAND OBSERVED IN JULY, 1886.

By F. J. Hanbury, F.L.S., and Rev. E. S. Marshall, M.A., F.L.S.

The following notes are the fruit of about four weeks' botanising in Caithness (109), W. Sutherland (108), and S. Aberdeen (92); in addition to the matter already published in this Journal for 1886 (pp. 343–4). A few hours spent at Dunphail, Morayshire (Co. 95, Elgin), produced, among other interesting plants, an *Equisetum* of which particulars will be found below.

Our best thanks are due to Mr. Arthur Bennett for his careful examination of many of the specimens collected, and for having conveyed some of the more critical forms to Professors Hackel and Lange for their determination; also to Mr. W. H. Beeby, of whose recent able paper on the Flora of Shetland (in the 'Scottish Naturalist' for 1887, pp. 20, &c.) advantage has been freely taken, and to whose personal inspection of some of the plants is due the avoidance of several (otherwise) possible errors.

The occurrence of several forms along the N. coast, identical with those lately discovered by Mr. Beeby in the Shetlands, is noteworthy; and, as only a few localities were worked there, and these in no case exceeded 300 ft. above sea-level, it is probable that others in his list will be found. There is certainly very much yet to be learnt about the flora of the two northernmost counties. Mr. J. F. Grant, of Wick, who has done so much towards elucidating the plants of Caithness, accompanied us on our excursions there, and in W. Sutherland.

The sign * denotes "new to Britain"; † "new to county" (so far as we are aware).

Cochlearia. The forms of *officinalis* gathered at Melvich (108) and near Wick (109) are remarkably small, but have veined pods, and are considered by Mr. Beeby to be rightly named. *C. græn-*

landica should be found on the N.E. coast of Caithness, and perhaps elsewhere as well.

Viola Curtisii Forster. Apparently always the var. *Mackaii;* a very different-looking plant from that of our southern and western coasts.

Cerastium arcticum Lange. The discovery of ripe seeds in one of the specimens collected in the Cairngorms, in 1885, has set at rest the doubt whether this name should stand. The S. Aberdeen plant looks very different from the Shetland form, kindly communicated by Mr. Beeby; it grows in dense prostrate tufts of a lighter green, and with leaves mostly narrow-lanceolate, subacute.

Sagina maritima Don. A minute form, from Keiss Links (109), is placed by Mr. Bennett between the type and var. *densa* (Jord.). A very large, prostrate form, from the stony shore of the Naver (108), is perhaps var. *debilis* (Jord.). Some of the plants were 5–6 in. across.—*S. subulata* Presl. A luxuriant form occurs on the cliffs W. of Melvich (108). Mr. Beeby writes: "This is not quite my Shetland form, which has pedicels and sepals quite glabrous."

Anthyllis Vulneraria L. A small state, from the cliffs W. of Melvich (108), seems intermediate between the type and var. *maritima* Koch, of which it has the silky pubescence. It is not unlikely that this variety will be found, if searched for.

Vicia Cracca L. A dwarf maritime state, with fleshy leaves, and flowers of the most brilliant blue, was gathered on cliffs about one mile W. of Reay (109).

Potentilla maculata Pour. Dr. Lange so names a plant abundant on the Little Craigindal (92). Herr Murbeck calls it *P. verna* L.; but we do not know in what sense he uses the name. The small flowers—with a bright orange basal spot—and leaves had encouraged a hope that it might prove an addition to our flora. In appearance it differs considerably from the ordinary state of *maculata*, being of smaller habit, and growing in open grassy ground.

†*Rosa Sabini* Woods. A handsome white-flowered plant, of which a good-sized patch occurs among the sand-hills W. of the Naver (108), is placed here by Mr. J. G. Baker.— † *R. hibernica* Sm. To this seems referable a plant growing in woods at Dunphail (95).

Parnassia palustris L. Occurs only an inch high on wet sands at Keiss Links (109).

Epilobium palustre L. Of a specimen from Loch Winless (109) Mr. Beeby writes: "Caithness plant somewhat like the Shetland form; which has, however, considerably larger flowers."

Solidago Virgaurea L., var. *cambrica* (Huds.). Cliffs at Melvich (108). In S. Aberdeen this seemed the usual form above, var. *angustifolia* Gaud. below, 2000 ft.

Matricaria inodora L. A maritime form from Dunnet Links (109) was sent to Mr. Beeby for his opinion. He writes: "I expect that *salina* and *phaocephala* pass into each other, and that yours is possibly intermediate. I could not name your plant unless I had types of the other forms (especially *salina*). My Shetland *phæocephala* has the flowers one full inch more in diameter (by actual measurement) than your largest; its ray-flowers are only half as

numerous. It is very dwarf,—3–4 in.,—and my specimens bear but two flowers each. Its phyllaries have the edges blacker, the centres greener." N.B.—The "var. *maritima*" is, when growing, a most distinct-looking plant, and we suspect that it should be restored to the specific rank given it by Linnæus.

†*Cnicus arvensis* Hoffm., var. *setosus* Bess. Two plants were seen at Georgemas Junction (109).

Hieracia. We hope to publish some notes on forms observed along the N. coasts, when duly identified; but may briefly say here that these appear to be Scandinavian in type, and to differ widely from the forms occurring in Aberdeenshire and southwards.

Leontodon autumnalis L., var. *pratensis* Koch. The dark-headed Highland plant so named by Babington does not at all closely resemble a Lincolnshire plant received from Mr. Beeby; and, as he points out, the term has probably been used here in too restricted a sense. The stalk is often branched in the Aberdeen subalpine form.

†*Armeria maritima* Willd., var. *planifolia* Syme. Specimens from Derry Cairngorm and Little Craigindal (92) appear to belong here.

Primula scotica Hook. It is clear, as pointed out to us by Mr. Grant, that the so-called var. *acaulis* is no more than an occasional state. In several cases we found it in flower, with an old flowering-stalk of typical character.

†*Gentiana Amarella* L., forma *multicaulis* Lange. Keiss Links and Reay Links (109), in good quantity. The flowers at Keiss were mostly monstrosities; those of the Reay specimens had the corolla-lobes *spreading* in sunshine not "always erect," as Mr. Beeby appears to have found the case. An exceedingly curious form, with yellowish white flowers, usually reddish without; very unlike our southern *Amarella* at first glance.

Veronica officinalis L. With leaves quite glabrous, by a burn in the Cairngorms (92), at about 1700 ft.

†*Thymus Serpyllum* Fries, var. *prostrata* Hornem. Cliffs at Melvich (108). Just Mr. Beeby's Shetland plant. Distinguished by its habit, the long white spreading hairs on the leaves, and the hairy flowers.

Betula sp. At about 2000 ft., by a streamlet in Glen Callater (92). This, after examination, Mr. Beeby inclined to name either *B. alpestris* Fr. or *B. intermedia* Thomas; Mr. Bennett, *B. subalpina.* A specimen was sent to Dr. Lange, who reported: "*B. intermedia* Thomas?" (Our examples appeared to agree well with the plate of this plant given in the 'Flora Germanica.') These alpine species of *Betula* are clearly very hard to distinguish, for our plant seemed to be in pretty fair condition. Botanists should gather good specimens of any mountain birches that look at all "off type."

Juncus balticus Willd. A very tall variety, with somewhat tortuous stems and lengthened peduncles, was found by the Thurso River (109).

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* Mr. Bennett now (May) writes:—"The specimen of the supposed *Betula* '*intermedia*' I sent to Dr. Lange was returned to me through the Copenhagen Botanical Society by its distributor, Herr Martensen; and in its transit some one has written against the *Betula*, '*intermedia* Thomas,' without any mark of doubt such as Lange himself expressed in his letter."

†*Luzula multiflora* Lej., var. *congesta* Koch. Loch Duran (109), as well as the type.

Potamogeton nitens Web. This varies much in appearance. The Loch Winless specimens were dull brownish green; "intermediate between the type and var. *currifolius*" (Mr. Bennett). Those from the Wick River were bright (grass-) green, whereas those from near Thurso were reddish, and were gathered for *P. rufescens*.

Eleocharis uniglumis Link. The Wick River form seems different from that of Shetland (Beeby sp.), and from all other specimens we possess or have seen, the heads being much shorter and rounder. The Rev. E. F. Linton thinks it distinct; and we may have more to write on the subject hereafter.

†*Schœnus nigricans* L., var. *nana* Lange. Specimens from Loch Winless (109) and the Naver (108) were considered identical with the Shetland plant thus named by Mr. Beeby. A form found in W. Cornwall and Jersey resembles it in general appearance.

Carex rigida Good., var. *inferalpina* Læstad. Occurs in the bog above the head of Canlochen Glen, Forfar, about two miles in a direct line from its original station. The variations of this species are most perplexing. — **Carex sp.* (*rigida* × *vaginata*?). Ravine of the Garachary (92). This occurred in small quantity, at nearly 3000 ft., with both its supposed parents. A specimen was sent to Dr. Lange, who reports: "Carex, species mihi incognita. E specimine unico vix determinationi accederim." The gradations between *rigida* and *vaginata* are remarkable; the characters of root and stem being rather that of the former, the bracts and colour of the spike usually resembling the latter. The general appearance is that of a hybrid, the fruit looking starved. — *C. pilulifera* L. A form with very long, acute glumes is fairly common among the Cairngorms, and in Glen Callater (apparently not lower than 2000 ft.). Its bracts vary greatly in size, and Mr. Bennett does not consider it to be var. *Leesii*.—*C. capillaris* L. On Dunnet Links (109) this occurs at sea-level, and nearly as low down at Betty Hill (108). — *C. pulla* L. Little Craigindal (92). Without personal authority in 'Topographical Botany.'

Phalaris arundinacea L. The form with variegated leaves (var. *picta* L.) was gathered four miles up the Wick River (109), growing with the type, far from houses. A single plant occurred by the Clunie, about half a mile below Braemar (92).

Anthoxanthum odoratum L. A small specimen, with very large fruit and long awns, was found in Corrie Ceannder (92), and was thought likely to prove a novelty. Mr. Beeby, on careful examination, found it to be affected with an *Ustilago*, like that of the "var. *pumila*" of *Agrostis vulgaris*, which had completely altered its appearance.

†*Agrostis alba* L., var. *maritima* Mey. (*fide* Hackel), was gathered by the Naver, at Betty Hill (108).

Deyeuxia strigosa Kunth. is in good quantity, and over a fair extent of ground, at Loch Duran (109). It should be found elsewhere in the vicinity, but is not easy to distinguish before the middle of July.

†*Deschampsia cæspitosa* Beauv., var. *pallida* Koch. A plant from Canlochen Glen, Forfar, was so named by Mr. Ar. Bennett. Two specimens from cliffs W. of the Naver (108), which seemed to agree fairly well with the description in 'Synopsis Germanica,' were sent to Mr. Beeby, who writes: "I think that the Betty Hill plants would probably prove to be *pallida*. But with varieties or critical forms I can scarcely commit myself to a definite expression of opinion on immature grasses—in *bud* only." A specimen from near Wick (109) seems intermediate between this and the type. The forms of this most variable plant, as it occurs in the alpine and subalpine parts of Aberdeenshire, are very difficult to name with any confidence.

†*Molinia cærulea* Mœnch., var. *minima* Rabenhorst. By the Naver, at Betty Hill (108), near sea-level; and above Corrie Lochan Uaine, Derry Cairngorm (92), at about 3000 ft. The only form noticed, and probably common in N. Scotland. It may have been passed over as var. *depauperata*. Height 5–9 in.; leaves narrower in the Sutherland, broader in the Aberdeenshire specimens; rootstock tending to be "bulbous."

**Catabrosa aquatica* Beauv., forma *grandiflora* Hackel. A very remarkable, prostrate form, which seemed likely to prove a distinct species. Length 4–12 in.; flowers double the size of those of the ordinary plant. On wet sands by the sea, at Dunnet Links (109).

†*Poa nemoralis* L., var. *Parnellii* Hook. & Arn. "The Colonel's Bed," Braemar (92).

†*Glyceria maritima* Wahl. By the Naver, at Betty Hill (108).—†*G. distans* Wahl. (*fide* Hackel). Cliffs S. of Wick (109); prostrate, forming dense bright green tufts, 9 in. to a foot across in some cases. Also W. of Melvich (108). A very striking form.

Festuca rubra L., var. *litoralis* (*fide* Hackel) grows at Betty Hill (108), as well as the type; and what looks like the same thing was found near Keiss Links (109).

**Equisetum sylvaticum* L., var. *capillare* Hoffm. (*fide* Ar. Bennett). Abundant by the river at Dunphail (95); also occurred in woods near. A very beautiful plant; bright emerald-green, 2–3 ft. high, with very long slender branchlets as fine as a thread. It differs widely in appearance from the type.

Lycopodium. Two forms grew together on the E. slope of Derry Cairngorm (92), at about 2500 ft., and looked quite distinct; one being typical *alpinum*, the other apparently *complanatum* (as Mr. Bennett thought), but unfortunately lacking fruit. The flattening of the leaves and branches is most marked, as are the spreading, fan-like growth of the branches, and the brighter green colouring. There is nothing very improbable in the occurrence of this species, which Mr. Druce reported from Clova in 1882.

Chara fragilis Desv., var. *barbata* Gant. (*fide* Ar. Bennett). Scotston Moor, near Aberdeen; and apparently the same form low down in Glen Callater (92). — *C. vulgaris* L., var. *longibracteata* Kuetz. (*fide* Ar. Bennett). Roadside pool between Wick and Castletown (109).

Nitella opaca Agardh. (*fide* Ar. Bennett). Pool near the Thurso River (109). A somewhat slender form.

ON A COLLECTION OF FERNS MADE IN WEST CENTRAL CHINA BY DR. A. HENRY.

By J. G. Baker, F.R.S.

In a collection of Ferns just received from Dr. Henry, made in the Province of Hupe, in West China, are contained the following new and interesting species:—

85*. **Asplenium** (Athyrium) **nephrodioides,** n. sp. — Caudex erect. Stipes densely tufted, stramineous above the base, ½–1 ft. long, densely paleaceous towards the base; paleæ firm in texture, lanceolate, brown, castaneous. Lamina lanceolate, bipinnate, 1–1½ ft. long, 2–3 in. broad at the middle, narrowed gradually from the middle to both ends, rather rigid in texture, green and glabrous above, slightly scaly beneath. Pinnæ very numerous, lanceolate, sessile, the central ones the largest, ascending, 2–3 in. long, ¼–½ in. broad, cut down to the rachis or a narrow wing into oblong deeply-toothed secondary segments, 1-12th to 1-8th in. broad. Veins copiously pinnate in the secondary segments; veinlets erecto-patent. Sori oblong, filling up the whole under surface of the pinnules. Indusium glabrous, persistent, variable in shape, sometimes curved and almost nephrodioid. — Patung District, *Dr. Henry* 1858! This is narrowed from the middle down to the base as gradually and completely as in *Nephrodium Beddomei* or *N. conterminum*.

8*. **Nephrodium** (Lastrea) **enneaphyllum,** n. sp. — Caudex erect. Stipes tufted, stramineous, nearly a foot long, densely paleaceous towards the base, sparsely upwards; basal paleæ large, lanceolate-acuminate, membranous, pale brown. Lamina deltoid, 8–9 in. long and broad, simply pinnate, moderately firm in texture, green and glabrous on both surfaces; pinnæ about 11, lowest the largest, petioled, lanceolate, 4–5 in. long, an inch broad, shallowly crenate, truncate at the base. Veins in numerous pinnate subpatent groups; veinlets fine, ascending, 3–4 on a side. Sori small, almost restricted to the central tuft of the pinnæ, medial in the veins. Indusium small, glabrous, subpersistent. — Ichang, *Henry* 3217! Intermediate between *N. podophyllum* and *N. Sieboldii*.

105*. **Nephrodium** (Lastrea) **gymnophyllum,** n. sp. — Caudex erect. Stipe slender, 6–8 in. long, pale, slightly scaly towards the base. Lamina deltoid, tripinnate, 6–8 in. long and broad, moderately firm in texture, green and glabrous on both surfaces. Lower pinnæ much the largest, distinctly petioled, deltoid, unequal-sided, much produced on the lower side; final segments oblong, erecto-patent, obtuse, ¼–⅓ in. long, 1-8th to 1-12th in. broad. Veins copiously pinnate in the final segments; veinlets ascending, lower forked. Sori supramedial on the veins, mostly single at the base of the final segments on the upper side. Indusium small, glabrous, reniform, fugacious.— Nanto and mountains to northward, *Henry* 2643 *ex parte*! Intermediate between *N. sparsum* and *N. chinense*.

298*. **Polypodium** (Phymatodes) **drymoglossoides**, n. sp.— Rhizome thread-like, wide-creeping. Fronds distant, dimorphic, simple, nearly sessile, the sterile ones oblong, 1–1½ in. long, ½–⅝ in. broad, the fertile ones linear-oblong, about ¼ in. broad, both green and glabrous on both surfaces, moderately firm in texture, obtuse, narrowed to the base. Midrib vanishing before it reaches the tip of the frond; veins anastomosing in copious irregular areolæ with free included veinlets. Sori large, superficial, globose, close, uniserial, confined to the upper half of the frond.—Ichang, *Henry* 1576! Nanto and mountains to northward, *Henry* 2965! Allied to *P. accedens* Blume.

72*. **Gymnogramme** (Selliguea) **Henryi**, n. sp.—Rhizome epigeous, wide-creeping, 1-12th in. diam.; paleæ small, lanceolate, membranous, patent, dull brown. Stipe slender, naked, stramineous, of the fertile frond nearly a foot long, of the sterile shorter. Lamina simple, oblong-lanceolate, acuminate, about a foot long, 2-2½ in. broad at the middle, narrowed suddenly at or about the middle and below this very gradually, moderately firm in texture, green and glabrous on both surfaces. Veins fine; areolæ copious, with free included veinlets. Sori erecto-patent, reaching from the midrib nearly to the edge in continuous or broken erecto-patent parallel lines.—Nanto and mountains to northward, *Henry* 2114! Allied to *G. Wrightii* Hook.

The collection also contains the following Indian and Japanese species, not previously gathered in China:—

Asplenium resectum Smith.
squamigerum Mett.
Nephrodium Beddomei Baker.
Dickinsii Baker.
Nephrodium splendens Hook.
Polypodium appendiculatum Wall.
Selaginella Wallichii Spring.

SYNOPSIS OF *TILLANDSIEÆ*.

By J. G. Baker, F.R.S., F.L.S.

(Continued from p. 115).

2. Schlumbergeria Lindeni E. Morren in Belg. Hort. 1883, 121, t. 10–12. *Massangea Lindeni* André in Ill. Hort. 1878, 55, t. 309.—Acaulescent; tuft about a yard in diameter. Leaves 20–30 in a dense rosette, lorate, 2-2½ ft. long, 2–3 in. broad, marked with copious vermiform transverse streaks of red-brown aggregated into irregular bands. Peduncle overtopping the leaves; bract-leaves green, erect, lanceolate, imbricated. Inflorescence a lax narrow panicle 3–4 ft. long, composed of several short dense erecto-patent spikes; lower spikes 3–4-nate; lower branch-bracts as long as the spikes; rachises green, glabrous; flower-bracts ovate, green, as long as the calyx. Sepals oblong, acute. Corolla whitish; segments lanceolate, shorter than the tube. Stamens shorter than the corolla-segments; filaments longer than the small oblong anthers.

Hab. Northern Peru, in the Province of Loreto. Introduced by Linden. First exhibited at Ghent in 1878.

3. S. Morreniana E. Morren in Belg. Hort. 1883, 46, t. 4–6. *Massangea Morreniana* Hort. Linden. — Leaves about 30 in a dense rosette, lanceolate, tapering to the point, 3–3½ ft. long, 2–2½ in. in. broad at the middle, marked with fine copious transverse vermiform lines of red-brown. Inflorescence with peduncle 3–4 ft. long; bract-leaves large, ovate, claret-purple. Panicle of about 5 dense oblong spikes; flower-bracts ovate, red. Calyx an inch long, whitish; sepals oblong, shortly united at the base. Corolla pale yellow, about 2 in. long; segments lingulate, rather shorter than the cylindrical tube. Stamens shorter than the corolla-segments; filaments filiform, longer than the anthers.

Hab. Peru or Ecuador, the exact locality not known. Introduced by Linden.

4. Guzmannia Ruiz & Pavon.

Sepals erect, shortly connate at the base, much shorter than the corolla. *Corolla* gamopetalous; segments oblong, obtuse, much shorter than the tube. *Stamens* inserted in the perianth-tube; filaments free; anthers linear-oblong, united in a ring round the style by their edges. *Ovary* free, 3-celled: style long; stigmas short. *Capsule* narrow, trigonous, coriaceous, dehiscing septicidally. *Seeds* numerous, narrow, with a long funiculus breaking up into threads. — Acaulescent, with leaves in a dense rosette. Inflorescence a simple multifarious or distichous spike, with each flower subtended and nearly hid by a large scariose bract.

Spikes multifarious . .	**Sp. 1–3.**
Spikes distichous . .	Sp. 4–5.

1. G. tricolor Ruiz and Pav. Fl. Peruv. iii. 38, t. 261; Lodd. Bot. Cat. t. 462; Lindl. Collect. Bot. fasc. 2, t. 8; Hook. Exot. Flora, t. 163; R. & S. Syst. Veg. vii. 1231; Beer, Brom. 102; Griseb. Brit. West Ind. 598. *G. sympaganthera* Beer, Brom. 103. *Pourretia sympaganthera* R. & P. Syst. i. 82. *Tillandsia clavata* Lam. Enc. i. 617. *T. monostachya* Linn. Sp. Plant. 410 (Plumier, Ic. 238, fig. 1). *Renealmia clavata floribus niveis* Plumier, t. 63. —Acaulescent; tuft 1½ ft. high, 2 ft. diam. Leaves 12–20 in a rosette, lanceolate from an ovate base, spreading, plain green, 1½ ft. long, 1–1½ in. broad at the middle, 2–3 in. at the base. Peduncle about a foot long; bract-leaves many, lanceolate, erect, imbricated. Flowers many, arranged in a moderately dense multifarious spike 1½ ft. or more long, above an inch in diameter; bracts ascending, ovate-acuminate, 1–1½ in. long; lower green, striped vertically with brown, upper bright red. Calyx ¾ in. long; segments oblong-lanceolate. Corolla whitish, twice as long as the calyx; segments lingulate, shorter than the cylindrical tube. Stamens shorter than the corolla-segments. Valves of the capsule rigid, brown, lanceolate, above an inch long.

Hab. Common in the West Indies from Cuba southward, and

along the Andes from Columbia to Peru. It is one of the most widely-spread and best-known species of the order. *G. maculata*, *grandis*, and *fragrans* are garden forms.

2. G. ERYTHROLEPIS A. Brong.; Planch. in Flore des Serres, t. 1089; Beer, Brom. 101. — Leaves 20–30 in a dense rosette, lanceolate, plain green, 1–1½ ft. long, 1½ in. broad at the middle, narrowed gradually to the point. Peduncle a foot long; bract-leaves lanceolate, erect, much imbricated. Inflorescence a dense simple erect multifarious spike 3–4 in. long, above an inch in diameter; bracts all plain unstriped bright crimson, ovate, obtuse, with or without a minute cusp, 1–1½ in. long, ¾–1 in. broad. Flowers as in *G. tricolor*.

Hab. Eastern Cuba, *C. Wright* 479! Described by Brongniart from a plant from St. Jago, Cuba, gathered by Linden, that flowered at Paris in 1852. Very near *G. tricolor*.

3. G. DEVANSAYANA E. Morren in Belg. Hort. 1882, 113, t. 8–9. — Acaulescent; tuft 2 ft. high, a yard in diameter. Leaves about 20 in a tuft, ensiform from an ovate base, rigidly erecto-patent, above 2 ft. long, an inch broad at the middle, acute, channelled down the face, more or less suffused and streaked with claret-brown. Peduncle about a foot long; bract-leaves lanceolate, erect, imbricated, the upper tinged with red. Inflorescence a dense oblong multifarious spike 2 in. long; bracts broad ovate, cuspidate, red, much imbricated, the lower an inch long. Calyx shorter than the corolla-tube; sepals oblong, acute. Corolla yellowish, above an inch long; segments oblong, shorter than the cylindrical tube. Stamens half as long as the corolla-segments.

Hab. Ecuador; Province of Cuenca, imported by M. Jacob-Makoy, of Liège, with whom it first flowered in Sept. 1882. Prof. Morren has suggested this may be identical with *Bonapartea strobilantha* Ruiz et Pav. Fl. Peruv. tab. t. 263 (*Anoplophytum strobilanthum* Beer, Brom. 42).

4. G. BULLIANA André in Rev. Hort. 1886, 324. *Caraguata angustifolia* Baker in Gard. Chron. 1884, ii. 616. Acaulescent. Leaves 40–50 in a rosette, linear from a large ovate base, firm in texture, acuminate, channelled down the face, glaucescent on the convex back, 5–6 in. long, ⅓–½ in. broad at the base of the blade, ¾ in. at the clasping base. Peduncle 3–4 in. long, closely sheathed by erect reduced leaves. Flowers 4–12 in a dense distichous simple spike; bracts broad ovate, compressed, striated, bright red, minutely cuspidate, ½ in. long. Calyx ½ in. long, whitish; segments oblong, obtuse. Corolla bright yellow, 2 in. long; segments short, oblong, obtuse. Anthers connate in a ring round the style.

Hab. Ecuador, in the Province of Loxa, *Seemann* 898! *Lehmann*! First gathered by Dr. Seemann in 1847. We had it alive from Messrs. Veitch in 1884, and it is in the Kew collection at the present time.

5. **G. crispa**, n. sp. — Leaves 30–40 in a dense rosette, linear from a dilated base, acuminate, very much crisped and recurved, 2–3 in. long, ½ in. broad at the dilated base, narrowed suddenly to ⅛ in. at the base of the blade. Peduncle 2 in. long; bracts small,

ovate, scariose, adpressed, imbricated, cuspidate. Flowers 6–15 in a dense distichous spike ½–1 in. long; bracts broad ovate, compressed, minutely cuspidate, ¼ in. long. Calyx coriaceous, as long as the bract; sepals oblong, obtuse. Corolla and stamens not seen. Capsule ¼ in. long.

Hab. New Granada, in the Province of Ocana, *Purdie*! Gathered in the year 1845. Nearly allied to *G. Bulliana*, but very different in its crisped leaves.

5. Catopsis Griseb.

(*Pogospermum* Griseb.; *Tussacia* Klotzsch.)

Sepals free to the base, chartaceous, oblong, obtuse, imbricated. *Petals* free, with only a small blade exserted from the calyx. *Stamens* shorter than the calyx, 3 hypogynous, 3 inserted on the claw of the petals. *Ovary* 3-celled; style and stigmas very short. *Capsule* ovoid, septicidally 3-valved, mucronate, but little longer than the calyx. *Seeds* tightly packed, with a short funiculus, a large flattened appendage, and a dense coma of fine flexuose threads.—Acaulescent, with thin nearly naked leaves in a dense rosette. Spikes simple or panicled, not strictly distichous. Petals always pale, either white or yellow.

Spikes simple; flowers small . .	Sp. 1.
Spikes many; flowers small . . .	Sp. 2–6.
Spikes 1 or few; calyx ⅓–½ in. long .	Sp. 7–9.

1. C. inconspicua Baker. *Pogospermum inconspicuum* A. Brong. in Ann. Sc. Nat. ser. v. i. 329. — Leaves thin, lingulate, falcate. Scape short, simple, few-flowered; flowers minute, sessile; bracts ovate. Sepals broad ovate, obtuse. Petals with a very minute ovate exserted limb. Stamens induced in the calyx. Stigmas sessile, short, uncinate.

Hab. French Guiana, *Melinon*. Flowered in the Jardin des Plantes at Paris in 1841.

2. C. apicroides Baker. *Tillandsia apicroides* Cham. et Schlecht. in Linnæa vi. 55. *Tussacia apicroides* Beer, Brom. 263. — Leaves thin, lorate, plain green, 6–8 in. long, an inch broad at the middle; apex deltoid-cuspidate. Peduncle very slender, about as long as the leaves. Spikes about 5, ascending, peduncled, forming a lax panicle, with a very slender flexuose axis, each 1½–2 in. long, laxly 12–20-flowered; all the flowers spreading; bracts green, ovate, shorter than the calyx. Calyx ⅙ in. long; sepals oblong, obtuse, imbricated. Petals with a small white orbicular exserted lamina.

Hab. Mexico, in the Province of Xalapa, *Schiede & Deppe*! *Galeotti*!

3. C. nitida Baker, non Griseb. *Tillandsia nitida* Hook. Exot. Flora, t. 218; R. & S. Syst. Veg. vii. 1222. *Tussacia nitida* Beer, Brom. 100. *Pogospermum nitidum* A. Brong. in Ann. Sc. Nat. ser. 5, i. 328. *T. Berteroniana* R. & S. *loc. cit.* *Pogospermum Berteronianum* A. Brong. *loc. cit.* *Catopsis nutans* Griseb. Fl. Brit.

West Ind. 599, excl. syn.—Acaulescent. Leaves 8–12 in a rosette, lanceolate from an ovate dilated base, 1½ in. broad, 8–12 in. long, narrowed gradually to an acute point, plain green, inconspicuously lepidote. Peduncle about a foot long; bract-leaves lanceolate, erect, greenish, imbricated. Spikes 10–20, arranged in a lax panicle with slender ascending branches, the lower compound; flowers erecto-patent, lax, 12–15 to a spike; flower-bracts ovate, ⅙ in. long. Calyx greenish, ¼ in. long; sepals oblong, obtuse. Petals with a small exserted oblong whitish blade. Stamens not longer than the calyx. Capsule ovoid, acute, a little longer than the calyx.

Hab. Cuba, *Wright* 674! Jamaica, *Wiles*! *Purdie*! St. Lucia, *Anderson*! Dominica, *Imray* 219! St. Domingo, *Bertero*. Trinidad, *Fendler* 817! British Guiana, *Parker*! *Jenman* 971! Sent by Wiles to the Liverpool Botanic Garden in 1827, at which date it was figured and described by Sir Wm. Hooker. Grisebach has crossed the old names of the two West Indian species.

4. **C. Hahnii,** n. sp.—Leaves 15–18 in. long, with oblong bases 6–8 in. long, 2–3 in. broad, connivent in an erect utriculus, the blade lanceolate, narrowed gradually from the base to an acute point. Peduncle about as long as the leaves; bract-leaves many, large, lanceolate, green, erect. Panicle 8–9 in. long; branches numerous, ascending, the upper simple, the lower trifurcate, subtended by large lanceolate bracts; spikes dense, at most an inch long, 10–15-flowered; flowers erecto-patent; bracts ovate, rather shorter than the calyx. Calyx ¼ in. long; sepals oblong, obtuse. Petals with a very small exserted blade.

Hab. Mexico, *Hahn*! Collected during the French Expedition to Mexico in 1865–6.

5. **C. Fendleri,** n. sp. *Tillandsia parviflora* Griseb. in Gott. Nacht. 1864, 16 (name only), non R. & P. — Acaulescent. Leaves 10–12 in a dense rosette, 6–8 in. long, lanceolate from an ovate dilated base, 1½ in. broad, narrowed gradually to an acute point, plain green, arcuate, imperceptibly lepidote. Peduncle erect, under a foot long; bract-leaves small, entirely clasping, not imbricated. Panicle lax, oblong, 3–4 in. long; branches about 7, the side ones horizontally patent, 1–1½ in. long; main-rachis flexuose; branch-bracts small, ovate, acute; flowers 5–7 to a spike, lax, erecto-patent; flower-bracts ovate, ⅙ in. long. Calyx ¼ in. long; sepals oblong, obtuse. Petal-blade minute. Capsule ovoid, scarcely longer than the calyx.

Hab. Venezuela, Tovar, *Fendler* 1523! This is quite different from the Peruvian *Tillandsia parviflora*, which is a true *Tillandsia* of the section *Platystachys*.

6. **C. flexuosa,** n. sp. — Leaves above a foot long, lanceolate-acuminate from a dilated oblong base 1½ in. diam., imperceptibly lepidote. Peduncle a foot long; bract-leaves lanceolate, adpressed, not imbricated. Panicle very lax, very cernuous, above a foot long; rachises flexuose; branches numerous, spreading, the lower compound; branch-bracts small, green, lanceolate; flowers laxly disposed, erecto-patent, at most 7–8 to a spike; flower-bracts ovate,

brown, $\frac{1}{8}$ in. long. Calyx ovoid, $\frac{1}{6}$ in. long; sepals oblong, obtuse. Petal-blade minute, pale.

Hab. Andes of Bolivia; Province of Larecaja, alt. 8000–9000 ft., *Mandon* 1172. Nearly allied to *C. nitida*.

7. C. VITELLINA Baker. *Tillandsia vitellina* Link, Klotzsch & Otto, Ic. Hort. Reg. Berol. t. 40. *Tussacia vitellina* Klotzsch; Beer, Brom. 99. *Tussacia fulgens* Klotzsch; Beer, Brom. 101. *Catopsis fulgens* Griseb. Gott. Nacht. 1864, 21. *Pogospermum flavum* A. Brong. in Ann. Sc. Nat. ser. 5, i. 328, tab. 23. *Tillandsia aloides* Cham. et Schlecht. in Linnæa, vi. 55. *Tussacia aloides* E. Morren in Bourg. Pl. Mexic. Exsic. No. 2104. — Acaulescent. Leaves 6–12 in a dense rosette, lanceolate from a large ovate base, thin, falcate, pale green, 6–9 in. long, $1\frac{1}{2}$–2 in. broad at the base, narrowed gradually to an acute point. Peduncle $\frac{1}{2}$–1 ft. long, with a few small clasping erect bract-leaves. Spikes 1–4, the end one the longest, 3–4 in. long, laxly 6–12-flowered; bracts ovate, shorter than the calyx. Sepals oblong, obtuse, imbricated, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Petal-blade small, oblong, yellow. Capsule ovoid, mucronate, at most twice as long as the calyx.

Hab. Mexico, *Schiede & Deppe* 1009! *Bourgeau* 1770! 2104! *Hahn*! Cuba *Wright* 675! 676! Trinidad, *Fendler* 819! St. Vincents, *Guilding*! British Guiana, *Parker*! Venezuela, *Moritz* 1230, *Fendler* 1509!

8. **C. stenopetala**, n. sp. — Leaves 10–12 in a rosette, thin, lanceolate, under a foot long, an inch broad at the middle, narrowed gradually to a very acute apex; base but little dilated. Panicle about a foot long, composed of 3–4 lax spikes, the side ones erecto-patent; branch-bracts very small; flowers laxly disposed, erecto-patent, 20–30 to a spike; flower-bracts oblong-lanceolate, nearly as long as the calyx, tightly adpressed to it. Flower-calyx cylindrical, green, glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long; sepals oblong, much imbricated. Petal-blade oblong-lanceolate, bright yellow, $\frac{1}{6}$ in. long. Stamens not exserted beyond the calyx.

Hab. Guatemala, *Bernoulli & Cario* 685! Nearly allied to *C. vitellina*.

9. C. NUTANS Baker, non Griseb. *Tillandsia nutans* Sw. Prodr. 56; Fl. Ind. Occ. i. 588; R. & S. Syst. Veg. iii. 1221. *Pogospermum nutans* A. Brong. in Ann. Sc. Nat. ser. 5, i. 328. *Bencalmia pendula* Gaert. Fruct. iii. 13, tab. 182, fig. 3. *Tillandsia sessiliflora* Ruiz et Pav. Fl. Peruv. tab. 271, fig. 5; R. & S. Syst. Veg. vii. 1226. *Pogospermum sessiliflorum* A. Brong. *loc. cit.*. *Tussacia sessiliflora* Beer, Brom. 101. *T. cornucopia* Bertero MSS. *Catopsis nitida* Griseb. Fl. Brit. W. Ind. 599, excl. syn. — Acaulescent. Leaves 6–12 to a rosette, lorate, thin, plain green, falcate, rounded at the apex, minutely cuspidate, 6–8 in. long, about an inch broad, little dilated at the base. Peduncle slender, a little longer than the leaves, with only a few small adpressed bract-leaves. Spikes 1–5, erect or drooping, the side ones erecto-patent, the end one the longest, 2–3 in. long, not shortly distichous, moderately dense, 10–20-flowered; bracts green, ovate, obtuse, shorter than the calyx. Calyx $\frac{1}{3}$–$\frac{1}{2}$ in. long; sepals oblong, obtuse, striated, glabrous, much

imbricated. Petal-blade small, oblong, whitish. Capsule ovoid, acute, half as long again as the calyx.

Hab. Cuba, *Wright* 1519! Jamaica, *Swartz*, *Wright*! *Bertero*. Amazon Valley, *Martius*, *Spruce* 102! *Burchell* 9394! Andes of Peru, *Pavon*.

(To be continued.)

REVISION OF THE AUSTRALIAN SPECIES OF *POTAMOGETON*.

By Arthur Bennett, F.L.S.

The examination of a series of Australian specimens of this genus, from Baron F. von Mueller, Mr. F. M. Bailey, and Mr. J. G. O. Tepper, seem to show that the account of the genus in the 7th volume of the 'Flora Australiensis' may now be amplified and revised. That there is yet more to be done, especially in West Australia, cannot be doubted. In differing on some points from so able a botanist as the late Mr. Bentham, I need hardly say that I do so only after careful examination of the material I possess.

1. Potamogeton natans L. (*verus*). — It is impossible to assign with any certainty the published stations given as this species; some at least are *P. tricarinatus* F. Mueller, others are probably *P. Tepperi* mihi.

2. P. Cheesemanii mihi (Journ. Bot. 1883, p. 66). *P. natans* L. ex parte (Hook.). *P. gramineus* L. (Hook.). *P. heterophyllus* Hook., non Schreb. *P. natans* v. *australis* Kirk!—To this I refer specimens from Baron von Mueller ("Tasmania, *Dr. Story*"). Various states of this have been named as "*gramineus* L.," "*heterophyllus* Schreb."

3. P. plantagineus Du Croz, v. *Jamaicensis* Griseb. Fl. Brit. W. Indies, p. 506.—Baron von Mueller sends a specimen gathered by Mr. J. B. Wilson "near the River Barwon, in the vicinity of Port Philip," which seems referable to this variety, matching Grisebach's specimen in Herb. Kew; but neither his nor Mueller's specimens are in fruit, so it is not with absolute certainty that I so name this.

4. P. tricarinatus F. Mueller ined. in Herb. Kew! — Certainly distinct from *P. natans*, under which it is placed at Kew. As Baron von Mueller will doubtless describe this, I pass it by with this notice. My collection contains specimens from Queensland from Mr. F. M. Bailey.

5. P. Drummondi Benth.! Flor. Austr. vol. 7, p. 171. — An endemic species, only gathered by Drummond in West Australia, and not since found.

6. P. javanicus Hasskarl in Act. Soc. Neer. 1, 26.—Baron von Mueller sends a specimen so named from Moreton Bay, Queensland. I have not seen a type-specimen from Java; but it seems distinct from *P. tenuicaulis* Mueller, to which at one time Baron von Mueller thought *tenuicalis* might be referable.

7. P. TENUICAULIS F. Mueller! (Fl. Austr. 7, p. 171); Frag. Plt. Aust. i. 90, 244; 8, 217. — Victoria; S. Australia; Queensland. Extending to Africa, or a nearly allied species.

8. 8. P. LUCENS L., var. LONGIFOLIUS (Gay sp.).—Tambo River, Victoria, *F. Mueller in Herb. Kew*!

9. P. CRISPUS L.! Flor. Austr. 7, p. 172.—Lake Colac, Victoria, *F. Mueller*. The plant of the Linnean Herbarium.

10. P. PERFOLIATUS L., var. MUELLERI mihi. *P. prælongus* Mueller, "perhaps not of Wulfen; Bentham, Fl. Austr., 7, p. 172." —In doubting this as the plant of Wulfen, Mr. Bentham was correct. The Australian plant is a variety of *perfoliatus*; certainly in facies much resembling *prælongus*; differing from *perfoliatus* by its less amplexicaul leaves, short peduncles, very dense spikes, and pale stipules. Most of the Australian specimens of *perfoliatus* are characterised by very short internodes.

11. P. ACUTIFOLIUS Link, Fl. Austr. 7, p. 173. *P. compressus* L.; Mueller in Herb. Kew! *P. zosterifolius* Schum.; Mueller in Herb. Kew! — As yet known for a single locality only. Murray River, Victoria; otherwise not yet known out of Europe.

12. P. OCHREATUS Raoul! Choix de Pl. de la N. Zeelande, p. 13. *P. obtusifolius* Bentham, Fl. Austr. 7, p. 172–3, non Mertens et Koch. *P. gramineus* R. Brown, Prod. 343. — Mr. Bentham refers the Australian plants to the *obtusifolium* of Mertens and Koch; but it is most certainly the New Zealand species of Raoul, which is abundantly distinct from all the forms of *obtusifolius*, of which I possess a type-specimen gathered by Mertens. For types of Raoul's plant I am indebted to Prof. Bureau, of Paris. Queensland, *Mueller*! *Bailey*! S. Australia, *Tepper*! Victoria, *Mueller*! Tasmania, South Esk River, "*Launcestor*, 1844."

13. P. PECTINATUS L.; Fl. Austr. 7, p. 173. — Derwent River, Tasmania, *leg. Abbot ex Mueller*. Only differing from the usual state in the shorter peduncles.

14. P. FILIFORMIS Nolte! *P. marinus* L., Mueller, non L. herb.! —Lake Colac, Victoria, *Mueller*. I believe the true plant, but ripe fruit is wanting.

15. **P. Tepperi** mihi. — "Pool 500 miles north of Brisbane, Queensland," *F. M. Bailey*. Neighbourhood of Pioneer River? "River Cygnet, Knicks, South Australia," *J. G. O. Tepper*.—Stems simple in specimens seen, 6–10 in. high; submerged (lower) leaves 4 in. long by $\frac{1}{2}$ in. wide, the lamina tapering at either end; upper leaves ovate-lanceolate; floating leaves from oval with subcordate bases to ovate with tapering bases; 21–23-veined ($3 \times 1\frac{1}{4}$ in.), coriaceous, on long petioles enlarged gradually upwards; stipules soon decaying; peduncles 2–3 in. long, thickening upwards; spikes $\frac{3}{4}$–1 in. long, dense in fruit; fruit nearly straight on the inner face, rounded, with three angles on the outer face, half-obovate, with a short beak forming a continuation of the inner face, with projecting processes irregularly distributed on the outer angles; embryo with its upper part incurved to half its depth.

Affinity with *P. natans* L., *P. polygonifolius* Pour., *P. Leschenaultii* Cham.! &c. (the drawing of the fruit of this in Linnæa, 2

(1827), t. 6, fig. 23, shows the fruit more carinated than in the type-specimen in the Berlin Herbarium). Quite distinct from Mueller's *P. tricarinatus*, with which, and specimens named *natans*, it has been mixed in Australian collections).

In addition to the above, I have a specimen of a plant from Mr. Tepper, which is probably near *P. flabellatus* Bab., but is too incomplete for naming with any certainty; also a specimen from South Australia of a possible new species near *polygonifolius*, but here again the material is insufficient. Several plants with distinct fruits of the *natans* series remain undescribed in herbaria, but generally as single or incomplete specimens; hence better material must be waited for.

REMARKS ON THE NOMENCLATURE OF THE EIGHTH EDITION OF THE 'LONDON CATALOGUE.'

By B. Daydon Jackson, Sec. L.S.

(Continued from p. 156.)

Since I wrote the communication which appeared in last month's number of the 'Journal of Botany,' I have become aware of three alterations in nomenclature in the earlier portion of the 'London Catalogue' and must retrace my steps to notice them. It is one of the annoyances inevitable when compelled, as I am, to deal with a large subject piecemeal, instead of being able to concentrate my attention upon this one topic, and deal with it in comprehensive fashion.

Mr. N. E. Brown has been good enough to draw my attention to type-specimens in the Kew Herbarium of *Lepidium heterostylum* Benth., from which it is clear that we must amend our lists as under:—

143. *L. heterostylum* Benth.! Cat. pl. Pyr. 95 (1826). *L. hirtum* Hook. Fl. Scot. i. 195, non DC. *L. Smithii* var. *alatostyla* Towns. Fl. Hants, 37. *Thlaspi hirtum* Sm. Fl. Brit. 684, non L.

Var. b. *canescens* Gren. et Godr. Fl. Fr. i. 150. *L. Smithii* Hook. Fl. Brit. ed. 1, 297 (1830).

The much-criticised name *alatostyla* therefore disappears.

172. *Viola persicifolia* Roth. Tent. ii. 271 (1789). *V. stagnina* Kit. ex Schultes, Oestr. Fl. ed. 2, i. 426 (1814). Nyman gives the date "1794," which is that of the anonymous first edition, and that has no mention of Kitaibel's plant or name.

218. *Cerastium arcticum* var. *Edmonstoni* Beeby. This varietal name has been already printed in Bot. Exch. Club Rept. 1886, p. 146, as cited from the 'Scottish Naturalist,' and must be withdrawn from *alpinum* and *latifolium*, under which it has previously stood.

272. *H. elodes* L. Am. Ac. iv. 105, and precedes Huds. Fl. Angl. 292.

281. *Malva borealis* Wallm. in Lilj. Sv. Fl. ed. 3, (1816). An earlier name is *M. pusilla* With. Arr. ed. 3, ii. 612 (1796).

286. *Radiola linioides* Roth. Tent. i. 71 (1788). Both generic and specific names here given precede Gmel. Syst. i. 289 (1791), the latter possibly independently established, having no reference to Roth.

290. Mr. Druce points out that the varietal name *crepitans* is due to Schüb. Fl. Würtemb. 211. I have not the work at hand to refer to, but Prof. Babington ascribed the variety to Schübeler in his Manual, ed. 2, 66 (1847).

292. *Geranium versicolor* L. Cent. i. 21 (1755) is the earliest name for the plant which Linnæus afterwards called *striatum* in Am. Ac. iv. 282 (1759), a fact for noticing which I have to thank Mr. Druce.

297. *G. pyrenaicum* Burm. f. was published in Diss. de Geraniis 27 (1759), and must take precedence of Hudson's *G. perenne*, in his Fl. Angl. ed. 1, 265 (1762). The species first made its appearance in Linnæus's writings in his Mantissa, 97 (1767).

299. *G. pusillum* L. Syst. ed. 10, 1144 (1759) antedates by three months Burman's publication in his Diss. de Geraniis.

315. *Euonymus europæus* L. Mr. Druce contends that our plant being *E. vulgaris* Scop. Fl. Carn. ed. 2, which is the residue of the Linnean species after Scopoli's *E. latifolius* had been separated from it, should be given in our lists. I do not think that this can be sanctioned; Linnæus's species as defined by him consisted of the commonly distributed form, which he further characterised as *α. tenuifolius*, whilst his *β. latifolius* was elevated into specific rank by Scopoli, leaving the type to bear the original name alone.

326. The genus *Genista* as defined by Bentham and Hooker includes *Sarothamnus* Wimm.

330. *Trigonella purpurascens* Lam. Fl. Fr. ii. 590, is misspelled *purpurescens* in DC. Fl. Fr. iv. 550, and I can assure one of my critical correspondents that the spelling in the Lond. Cat. ed. 8, is as given by Lamarck.

335. It was Desrousseaux who described *Medicago lappacea*, not Lamarck, therefore the reference should read "c. *lappacea* (Desr.)."

336. *Medicago arabica* All. Fl. Ped. i. 315 (1785) is the same plant afterwards called *M. maculata* Sibth. Fl. Ox. 232 (1794).

337. *M. minima* L. Fl. Angl. 21 (1754); Am. Ac. iv. 105 (1759); Desr. in Lam. Encyc. iii. 636 (1709).

338. *Melilotus officinalis* Lam. Fl. Fr. ii. 594 (1778), Willd. Enum. ii. 789 (1809), precedes *M. altissima* Thuill. Fl. Par. ed. 2, 378 (1799).

340. *M. arvensis* Wallr. Sched. 892 (1822) must take the place of the dispossessed *M. officinalis* Desr. in Lam. Encyc. iv. 62 (1797) non Willd.

341. *M. indica* All. Fl. Ped. i. 308 (1785) is older than *M. parviflora* Desf. Fl. Atl. ii. 192 (1800).

343. *Trifolium pratense* Lam.—A correspondent asks why give Syme as the author of vars. *satirum* and *sylvestre* when he "refers them to Mill. and Reich.?" The answer is that Syme appears to be the author of the varietal names for the forms published as

species by Miller *T. sativum* and by Reichenbach *T. pratense* respectively; in the latter case the name even is different.

344. *T. medium* L. Am. Ac. iv. 105 (1759); Nov. Fl. Suec. in Faun. Suec. ed. 2, 558 (1761).—Here are two earlier records of the name used by Linnæus before it came out in Huds. Fl. Ang. ed. 1, 284 (1762).

345. *T. ochroleucon* Huds. Fl. Angl. ed. 1, 283 (1762) is earlier than *T. ochroleucum* Linn. Syst. ed. 12, iii. App. 233 (1767).

346. *T. squamosum* L. Am. Ac. iv. 105 (1759) is an earlier name than *T. maritimum* Huds. Fl. Angl. ed. 1, 284 (1762).

365. I am asked why "*Anthyllis rubra* Gouan, 1765—1795," should not supersede *A. Dillenii* "Schult. 1805?" I have spent much time in trying to discover where Gouan published this name, as I have no entry of any such name in the MS. of the 'Index' at Kew. The earliest varietal name for the plant, since pre-Linnean botany, known to me is *β. coccinea* Gray, Nat. Arr. ii. 597 (1821), preceding DeCandolle's variety *rubriflora* in Prod. ii. 170 (1825); it is here that I find the first publication of *A. Dillenii* Schult. in herb. Balbis, apparently a manuscript name till then. I have just discovered the publication of Gouan's *A. rubra*; the name occurs in his Herbor. p. 173, as a naked name, and therefore justifies its entire neglect; and also explains why it did not find its way into our 'Index,' as the page in which it occurs is filled with a mere list of names. The genus in question is thus printed by Gouan:—

Anthyllis vulneraria.
flava.
rubra.

As to the latter names, we are left to guess the varieties meant, but Gouan gives no further description, so far as I know.

366. *Lotus corniculatus* var. *villosus* is ascribed to Cosson and Germain, because they reduced Thuillier's species, Fl. Par. ed. 2, 389 (1799), to varietal rank.

380. *Onobrychis viciæfolia* Scop. Fl. Carn. ed. 2, ii. 76 (1772) is earlier than *O. sativa* Lam. Fl. Fr. ii. 652 (1728).

392. *Vicia angustifolia* L.; Am. Ac. iv. 105 (1759), is earlier than Reich. Fl. Moen. Fr. ii. 44 (1778), or Roth, Tent. i. 310 (1788).

405. *Lathyrus macrorrhizus* Wimm. Fl. Schles. 166 (1832) is clearly preceded by the name of *L. montanus* given by Bernhardi in 1810. The variety *tenuifolius* "Roth" was "described by Roth as a variety of *Orobus* not of *Lathyrus*." I give this note of Mr. Druce's as I received it, as I have neither of these volumes at hand; Nyman Consp. 200, cites both specific names as synonyms of *Orobus tuberosus* L.

406. *Orobus niger* L. Sp. Pl. ed. 1, 729 (1753) *Lathyrus niger* "Wimm. Fl. Schles. 166." Wimmer being cited for *Orobus* in ed. 7 must have been a slip.

(To be continued.)

SHORT NOTES.

Nitella glomerata Chev. in Warwickshire. — During the autumn of last year, 1886, in making an excursion from Stratford-on-Avon to Illmington, I came upon some moorish land of considerable extent, looking very weird and uncared; and, although at that time remarkably arid, the plentiful occurrence of the large grassy tussocks of *Molinia cærulea*, in some of which were a few flowering shoots, sadly depauperated, seemed to indicate that this now dry and barren land had at some more remote period been an extensive bog. Here and there upon the moorland were some shallow pits formed by the removal of stone for road-mending, showing by the weeds growing in and around them that in wet seasons they would form the homes of marsh plants; at that time, however, they were quite dry, and the plants were mostly stunted specimens of *Galium palustre*, *Hypnum fluitans*, &c. Feeling interested specially in that part of Warwickshire, I paid a visit to this moorland a week or so since. I found that the recent rains had filled the pits, and that there was a rich growth of marsh flowering plants and mosses, and, what was especially interesting, an abundance of *Nitella glomerata* splendidly prolific in fruit. With this, and equally abundant, was a fine moss I have never seen in Warwickshire before, *Hypnum lycopodioides*. Both plants are remarkable in their appearance, and could scarcely be mistaken for anything else by even a novice; and I think that both are new to the Midland Counties. The moorland on which these occur is in the valley of the Stour, and upon the very borders of Worcestershire, the small stream which forms the county boundary being about two hundred yards from the pits I have mentioned, so that both plants may probably occur in Worcestershire also.—J. E. Bagnall.

Falcaria Rivini Host. in East Kent. — Last autumn the Rev. Aubrey L. Moore, while botanising near Westgate-on-Sea, found in a corn-field a number of specimens of an umbelliferous plant which was unknown to him; on his return he described it to me as having leaves which recalled to him the Eng. Bot. plate of *Cicuta virosa*. At my request he later on revisited the locality,—the field had then been reaped,—and sent me the only specimen he could find, a small lateral branch, but from this I was enabled to identify it with a well-known continental corn-field plant, *Falcaria Rivini*. On making enquiries, Mr. Moore found that the seed-corn with which the field had been sown was not of foreign origin, but it is probable that the plant had been introduced to the locality. Mr. Moore only observed it in one field; perhaps this notice may lead to its being discovered elsewhere in the county.—G. C. Druce.

[The plant has also been recorded from Hants (Journ. Bot. 1874, 279).—Ed. Journ. Bot.]

Note on Nomenclature. — The following case of nomenclature will probably interest the readers of the 'Journal of Botany':—In Kuetzing's 'Species Algarum' (1849) Brébisson named and described

a species of *Navicula* as *N. tumida*. In 1883 the Rev. W. Smith renamed it *N. Jennerii* in his 'British Diatomaceæ,' vol. i., p. 49, intentionally and not in ignorance, as he cites Brébisson as having communicated specimens to him in September, 1852. In the same vol., p. 53, he describes another "*N. tumida*, n. sp." from Guildford, a fresh-water form, whereas the original was marine. In the fourth edition of Pritchard's 'Infusoria,' which came out early in 1861, the preface being signed December, 1860, Ralfs very properly kept up the first-named *N. tumida*, and disposed of the interloper by re-naming it *N. anglica* Ralfs. So far the matter is clear, but it happens that a few months earlier Grunow had published a new genus, *Scoliopleura*, in the Verh. zool.-bot. Ges. Wien. x. (1860), 554, with five species, one of them being Brébisson's *N. tumida*, which in Grunow's list stands as *S. Jennerii*. The point is, can Smith's *N. tumida* stand, as it was evidently a bad name from the moment of publication? I think it must stand, for apparently no one seems to have paid any regard to these two similarly-named Algæ whilst they stood in the same genus until Grunow did; but the original species having been withdrawn from *Navicula*, and the genus *Scoliopleura* retained by Rabenhorst, Fl. Europ. Alg. 228, the false *tumida* becomes legitimate. Had Ralfs published his *N. anglica* before Grunow's paper above cited, Smith's *N. tumida* of course must have fallen. It is quite possible that I have overlooked some intermediate writer who may have taken notice of these forms, but, on the present aspect of matters, I suppose that the fresh-water diatom must bear the name *N. tumida* W. Sm., with *N. anglica* Ralfs as a synonym.—B. Daydon Jackson.

Leucojum æstivum in N. Wilts.—My friend Mr. F. Richardson, a Master at Marlborough College, found this plant in May last, on a "field day" of the Natural History Society, in water-meadows near the Kennet, between Ramsbury and Chilton Foliat. The habitat was "out-of-the-way" and far from houses, and he has no doubt that it is native.—Edward S. Marshall.

Arabis ciliata R. Br. in Clare. — On July 13th, 1885, during a walk from Ballyvaughan, Co. Clare, to Black Head, I noticed an *Arabis* growing in fair quantity, in one or two places by the road-side. Being in a careless mood (I suppose), I did not pay much attention to it, but fortunately gathered and preserved one specimen. Long afterwards, when about to put it away in my herbarium, I discovered it to be *A. ciliata* R. Br. I think this is a new county record.—R. P. Murray.

Nomenclature of Boea.—*Boea Hancei* Clarke (DC. Mon. Phan. v. 144) is identical with *B. dictyoneura* Hance (Journ. Bot. 1883, 168), the same number of Hance's herbarium (now in the British Museum) being cited for each. The latter name, published in June, 1883, takes precedence of the former, which dates from September in the same year.—James Britten.

NOTICES OF BOOKS.

The Flora of Leicestershire, including the Cryptogams, with Maps of the County. Issued by the Leicester Literary and Philosophical Society. London: Williams & Norgate. 8vo, pp. xxvi. 373.

This latest addition to our county floras possesses some noteworthy features. The first is one which is presented to us on the title-page, on which no author's name appears, the work having been compiled by a sub-committee of the Leicester Literary Philosophical Society, consisting of Messrs. F. T. Mott, E. F. and C. W. Cooper, T. Canter, and J. E. M. Finch, "on the basis of a MS. prepared in 1852 by the late Rev. W. H. Coleman, which has been enlarged, completed, brought up to date, mostly re-written, and entirely re-arranged, in accordance with the third edition of Hooker's 'Student's Flora.'" Such extensive changes remind one somewhat of the stocking to which a new leg was added, succeeded by a new foot; but this prominent acknowledgment of Mr. Coleman's MS. shows a generous recognition of previous workers in the same field, which is not always to be met with in the books of those who have entered into the labours of others.

We shall probably not be far wrong in supposing that the brunt of the work has fallen upon Mr. Mott, the chairman of the sub-committee, who has long been known as a worker in botany, and whose published work dates back to 1843.

As the preface reminds us, the only Flora of Leicestershire previously published was that by Miss Mary Kirby, which appeared in 1850. Mr. Coleman paid much attention to the subject, for, in addition to the MS. on which the present Flora is founded and the catalogue prepared by him for White's 'Directory of Leicestershire,' there is in the Department of Botany of the British Museum a MS. "Synopsis of the Flora of Leicestershire" (formerly the property of the Rev. W. W. Newbould), prepared by him with much care: in this the county is divided into twelve parts, and the distribution of each species shown in tabular form; there are also special lists of the characteristic plants of each district, grouped into sets with titles, such as "arvenses," "pratenses," &c., denoting their habitats. The districts correspond with those of the present Flora.

The authorities are arranged in three groups—the first or "old" period (including Crabbe and Pulteney) up to 1820; the second or "middle" period (including the two Babingtons, Bloxam, Coleman, and Miss Kirby) extending from 1820 to 1850; and the third or "recent" period, from 1850 to the present time. The "Mr. A. M. Barnard" of the second period should be "*Miss* A. M. Barnard," a grand-daughter of Sir J. E. Smith, who is mentioned in the 'Flora Hertfordiensis.' Pulteney's plants are in the British Museum Herbarium.

Although a useful contribution to our local knowledge, it can hardly be said that this Flora is quite up to the high standard

which has been reached by some of the more recent county floras. The comparative absence of minute examination of the works of our earlier writers and of biographical details is perhaps noticeable rather because of the careful way in which these have been elaborated by others than in consequence of their essential importance. But the critical genera seem to have received inadequate attention. The Rubi, for instance, are mainly as Coleman and Bloxam left them, though a good many changes have taken place during the last thirty years; and there is an absence of notes showing an intimate personal acquaintance with the plants, which make a local flora of value beyond the limits of its actual range, and of which those in Mr. Briggs's 'Flora of Plymouth may be taken as types. Here and there we find an excursus of this kind, as in the note upon *Capsella*, where seven forms are named and described. Unfortunately, however, there is a confusion of terms in the note which makes it difficult to follow the author's meaning, and he himself seems to think the characters laid down of no permanent value.

The most striking feature of the book is undoubtedly to be found in the attention given to the cellular plants, especially to the Algæ, which are undertaken by Mr. F. Bates. So far as we are aware, no local flora has hitherto contained so elaborate an account of this group of plants; the list is accompanied by descriptive notes, and occupies more than thirty pages, excluding the Diatoms and Desmids, the former of which find no place in the Flora, while the latter are undertaken by Mr. John Roy, of Aberdeen. Mr. Bates describes three new species—*Œdogonium Bernardense*, *Anabæna nitellicola*, and *Sphærozyga Cookeana*. We are glad to see that no attempt has been made to supply the Algæ with "English" names, after the fashion of those which are given for the Fungi.

J. B.

Handbook of the British Flora. By George Bentham. Fifth edition, revised by Sir J. D. Hooker. 8vo, pp. lxxx. 584. London: L. Reeve. Price 10s. 6d.

The names of these two illustrious botanists, who will always be associated with the 'Genera Plantarum,' are now found together in the title-page of a British Flora. Certainly no one could have been found more fitting than Sir Joseph Hooker for the necessary task of bringing the work of his late illustrious colleague up to date, as no one could so well realise the position which Mr. Bentham would have taken with regard to the more recent additions to our Flora. The present volume contains all that has tended to render former editions popular text-books, chiefly among which must be reckoned the excellent "keys" to the species; with a great deal of added matter, distinguished by its inclusion in square brackets.

The new 'Handbook' will certainly be useful to many, especially to beginners, but we should be inclined to doubt whether it will not to some extent interfere with the sale of the 'Student's Flora.' This, however, is not our affair. We should like to have

seen a revision of the nomenclature, in accordance with the older names which are now finding their way into use; but even such known inaccuracies as *Arenaria trinervis* are allowed to retain their place. We do not envy the task of the neophyte who endeavours to correlate the nomenclature of the 'Handbook' with that of the new 'London Catalogue.' Most of the recent novelties have been included, although some—among them, rather to our surprise, *Arum italicum*—are not accorded specific rank; and many of the forms of aggregate species are briefly defined.

New Books.—F. Kruse, 'Botanisches Taschenbuch' (Berlin, Paetel: 8vo, pp. xviii. 469).—A. Moloney, 'Sketch of the Forestry of West Africa' (Sampson Low: 8vo, pp. vi. 533).—G. Volkens, 'Die Flora der Ægyptisch-Arabischen Wüste' (Berlin, Eggers: 4to, pp. 156, tt. 17). — E. Pfitzer, 'Entwurf einer natürlichen anordnung der Orchideen' (Heidelberg, Winter: 8vo, pp. 108). — L. Koch, 'Die Entwickelungsgeschichte der Orobancheen' (Heidelberg, Winter: 8vo, pp. viii. 388, tt. xii).—G. Bonnier, 'Les Plantes des Champs et des Bois' (Paris, Baillière: No. 1, pp. 80, 154 figg., 1 plate).—C. Fraenkel, 'Grundriss der Bakterienkunde,' ed. 2, (Berlin, Hirschwald: 8vo, pp. vi. 374).

Articles in Journals.

Botanical Gazette (April). — J. M. Coulter & J. N. Rose, 'Umbelliferæ of E. United States' (1 plate). — W. K. Martin & S. B. Thomas, 'Autumnal changes in Maple-leaves.' — B. D. Halsted, 'A plant Heliostat' (*Malva borealis*).

Bot. Centralblatt (Nos. 19, 20, 21).—S. Gheorgieff, 'Beitrag zur vergleichenden Anatomie der Chenopodiaceen' (4 plates).

Bot. Zeitung (Ap. 29).—F. Oltmanns, 'Ueber die Entwickelung der Perithecien in der Gattung Chætomium.' — J. Reinke, 'Entgegnung bezüglich der subjectiven Absorptionsbänder.' — (May 6, 13, 20).—E. Zacharias, 'Beiträge zur Kenntniss des Zellkerns und der Sexualzellen.'

Botaniska Notiser (Häft. 3). — C. Kaurin, *Bryum angustifolium*, sp. n. — A. Callmé, *Carex flava* var. *Marssoni*. — A. Rudberg, 'Förteckning öfver Lugnåsbergets fanerogamer och ormbunkar.' — F. Svanslund, 'Anteckningar till Blekingesflora.'

Bull. Soc. Bot. France: xxxiv. Comptes Rendus 2 (May 1).—A. Deflers, 'Nouvelles contributions à la Flore d'Aden' (*Cleome brachystyla*, *Euphorbia adenensis*, spp. nn.). — R. de Nanteuil, '*Orchis Spitzelii*.'—H. Loret, '*Rubus collinus* DC.'—A. Chatin, 'Les plantes montagnards de la flore parisienne.' — E. Prillieux, 'Sur la propagation du *Peronospora viticola* a l'aide des oospores.' — J. Timbal-Lagrave & E. Marçais, '*Lamium hirsutum* et *L. maculatum*.' — E. Bescherelle, 'Mousses du Tonkin' (9 new species). — P. van Tieghem, 'Sur le second boiss primaire de la racine.'

Bull. Torrey Bot. Club (May).—L. M. Underwood & O. F. Cook, 'American species of *Marsilia*.' — G. Vasey, *Poa rupestris*, *Panicum Harvardii*, spp. nn. — D. C. Eaton, '*Asplenium rhizophyllum* var. *Biscayniamum*, n. var.' (1 plate).

Flora (April 1, 11). — F. Arnold, 'Lichenologische Fragmente' (3 plates). — (Ap. 21, May 1). J. Schrodt, 'Neue Beiträge zur Mechanik der Farnsporangien.'—(May 1, 11, 21, June 1). A. Naumann, 'Beiträge zur Entwickelungsgeschichte der Palmenblätter' (2 plates).—(May 11). K. Müller Hal, 'Beiträge zur Bryologie Nord Amerika's.'—(June 1). Memoir of A. W. Eichler.

Gardeners' Chronicle (May 7). — M. Foster, 'New Irises' (*I. Duthiei*, *I. Kingiana*, *I. Hookeriana*, spp. nn.). — (May 14). W. B. Hemsley, 'The Botanical Magazine.'—*Hydrosme Leopoldiana* Mast., sp. n. (figs. 122, 123).—(May 28). *Urginea macrocentra* Baker, n. sp. —W. G. Smith, *Peziza tuberosa* (fig. 137).

Journal de Botanique (May 1). — E. Boudier, 'La forêt de Carnelle au point de vue botanique.' — (May 1 & 15). E. Belzung, 'Sur la naissance libre des grains d'amidon et leur transformation en grains de chlorophylle.'— (May 15). P. Maury, 'Sur les variations de structure des *Vaccinium* de France.'

Magyar Növénytani Lapok (March).—Memoir and Bibliography of A. W. Eichler.

Œstrr. Bot. Zeitschrift (April). — L. Celakovsky, '*Utricularia brevicornis*.' — A. Hansgirg, 'Algarum aquæ dulcis species novæ' (*Plectonema phormidioides*, *Leptochæte nidulans*, *Dactylococcus rhaphidioides*, *Inoderma majus*, *Protococcus variabilis*). — W. O. Focke, 'Zygmorpher Blüthenbau.' — E. Formánek, 'Mährische und schlesische Rubus-Formen.'—J. Ullepitsch, '*Epipogum Gmelini*.'—(May). E. Formánek, '*Centaurea carpatica*, n. sp.'—L. Celakovsky, '*Narthecium Reverchoni*, n. sp.'—B. Blocki, '*Poa polonica*, n. sp.'—J. Palacký, 'Zur Homa- (Soma-) Frage.' — W. Voss, 'Bildungsabweichungen un *Galanthus nivalis*.'—A. Garcke, Memoir of A. W. Eichler (22 Ap. 1839—2 March, 1887).

Pharmaceutical Journal (May 7). — E. M. Holmes, 'Vegetable Tallow.'

LINNEAN SOCIETY OF LONDON.

March 3rd, 1887.—W. Carruthers, F.R.S. President, in the chair. — The following gentlemen were elected Fellows of the Society:—Mr. B. S. Dyer, Right Hon. Sir E. Fry, Mr. S. T. Klein, Mr. C. Mariés, Mr. E. S. Marshall, Mr. R. Morgan, Mr. J. B. Stone, and Mr. A. W. Tait.—A paper was read by Mr. Alfred W. Bennett on "The Affinities and Classification of the Algæ." He referred to Prof. Sachs' scheme of a classification of *Thallophytes* into *Zygosporeæ*, *Oosporeæ*, and *Carposporeæ*, based on the mode of reproduction and degree of complexity of the sexual process alone; but maintained that the true affinities were more in accordance with

the old classification into the two distinct series of Fungi and Algæ. He believes arrest of development has had an important influence in many presumed deviations among the groups in question. Retrogression may take the form of the suppression of either the vegetative or the reproductive organs, and wherever one of these sets of organs is suppressed at the expense of the other, retrogression may be *primâ facie* assumed. If the principle advocated by the author holds good, it leads towards the almost abandoned division of the Algæ into the green, the red, and the brown,—*Chlorosporeæ*, *Rhodosporeæ*, and *Phæosporeæ*. It would appear as if at an early period in the development of the simplest form of vegetative life, three kinds of cell-contents were represented, a colourless, a blue-green, and a pure green. Based thereon are the author's three great divisions:— I. *Schizomycetes*, forms entirely destitute of chlorophyll, and adapted to carry on only a parasitic existence; II. *Chroococcaceæ*, unicellular organisms, with cell-contents composed of watery blue-green endochrome diffused through the protoplasm, without distinct chlorophyll-grains, starch-grains, or nucleus; III. *Protococcaceæ*, characterised by cells possessing a nucleus, starch-grains, pure chlorophyll identical with that of higher plants, and in certain states a true cell-wall of cellulose. The (I.) *Schizomycetes* lead to the Fungi, which are not discussed by the author. The (II.) *Chroococcaceæ* pass through the *Oscillariaceæ* to *Nostocaceæ*. The (III.) *Protococcaceæ* are the great derivatives of the Algal group. Hence three great lines of descent are indicated. (1) The Diatoms are regarded as of remote origin, very low in the scale. (2) The *Cœnobiæ* comprise a series through *Sorastreæ* to *Volvox* and allies. (3) The *Eremobiæ* as a line of descent pass to the *Multinucleatæ*, e.g., *Siphoneæ* and *Siphonocladaceæ*. Thence cell-division originating, proceeded to the *Confervoideæ isogamæ*, the Conferva group. From these in three different lines have sprung: (*a*) the *Conjugatæ*, including *Zygnemaceæ* and Desmids; (*b*) the brown seaweeds adapted to deep-sea life, *Phæosporeæ*, terminating in *Fucaceæ*; and (*c*) the *Confervoideæ heterogamæ*, at the extreme of which the *Coleochæteæ* are reached. The *Coleochæteæ* lead direct to the red seaweeds or *Florideæ*, a natural group with great variety in development of the sexual organs. By arrest of development branches proceed on the one hand to the *Nemalieæ*, on the other hand through the *Bangiaceæ* to the *Ulvaceæ*; while at a tangent from true Algæ were evolved the *Characeæ*, the Mosses, the Gymnosperms, and lastly the Angiosperms.—A paper was read on "The Disease of Colocasia in Jamaica," by Mr. G. Massee and Mr. D. Morris. The negroes of the West Indies give the name "Cocoes" to the main stem and shoots of a species of Aroid. This forms a wholesome food, and is said to be preferable to yams and sweet potatoes. A blight arises in the tubers similar to the potato-disease; and as shown by the authors this is produced by a fungus belonging to the genus *Peronospora*, a new species named by them *P. trichotoma*. Instructions are given as to remedial measures, an important one being the absolute necessity of badly affected plants being wholly destroyed.

March 17*th*.—William Carruthers, F.R.S., President, in the chair.—Mr. Travers J. Briant, Mr. J. Errington de la Croix, and Mr. William West, were elected Fellows of the Society.—A recommendation of the Council to present to the British Museum, Kew, and the Oxford Botanic Gardens, the Society's Carpological Collection, was submitted to the Fellows, but was not approved by them.—Mr. Charles Baron Clarke, F.R.S., was elected into the Council in the place of Dr. Henry Trimen, who retired.—A paper was read, *viz*.,—"Observations on the genus *Ficus*, with special reference to the Indo-Chinese species," by Dr. George King, of the Royal Botanical Gardens, Calcutta. The genus *Ficus* was founded by Linnæus and included 7 species in his 'Species Plantarum,' 1 ed. Sprengel's edition of the 'Systema' (1825) contained 118 species. Blume described 93 Malayan Figs and Roxburgh 55 Indian species. In the 'Hortus Cliffortianus' Linnæus clearly comprehended the difference of the sexes, *i.e*., Caprifig = male, the so-called Fig = female, and *Erinosyce* = hermaphrodite. Vahl seems to have misunderstood the arrangement of the sexes, and Blume apparently followed him. Roxburgh is the first writer who examined minutely the florets of nearly the whole of the species, finding only two that were not androgynous and the majority monandrous. Later on Gasparrini and Miquel each made a careful study of the flowers of the genus, and separately gave different classifications of the group. Miquel subsequently altered his arrangement, making his genera into 6 subgenera, while enumerating 405 Old World, 128 American, and 22 species of doubtful nativity. In the 'Genera Plantarum' of Bentham and Hooker, four of Miquel's subgenera are admitted, a fifth considered doubtful, and a sixth rejected. These authors regarded Miquel's divisions as too loosely defined, and recommended a reworking of the group. Dr. King describes the structural peculiarities of the flowers of the genus *Ficus*. He specifies (1) male, (2) pseudohermaphrodite, (3) neuter, and (4) female fertile flowers. Besides these he states that there occurs in all the species of *Ficus* a set of flowers originally named by himself "Insect-attacked-flowers," but for which he has adopted Count Solms-Laubach's term "Gall-flowers," the latter botanist having anticipated him in publication, though Dr. King's researches had been commenced earlier. In the paper now read Dr. King enters into the question of these gall-flowers, stating that in the majority the pupa of an insect is present, and this pupa can usually be seen through the coats of the ovary. The pupa when perfected escapes into the cavity of the receptacle by cutting its way through, or by bursting these coats; and fully developed winged insects are often to be found in considerable numbers in the cavity of the fig. The opening through which each insect has escaped from the ovary in which it has been developed is afterwards clearly visible. The pupa of the insect must become encysted in the ovary of the gall-flower at a very early period, for about the time at which the imago is escaping from the ovary the pollen of the male flower is only beginning to shed. There is nothing in itself remarkable in the mere occurrence in the genus of numerous flowers having the general form of females,

which yet by reason of certain peculiarities in their structure are incapable of fertilization by pollen and practically barren; while at the same time their structural defects fit them for becoming the nidus for the larvæ of special insects. But when the manner in which these malformed flowers are disposed in the receptacle is inquired into, it becomes clear that through the interposition of insects these malformed female flowers may play a most important part in the life-history of many species of the genus *Ficus*. Thus from the peculiarities in the structure and arrangement of the flowers, Dr. King is of opinion that the evolutionary history of the genus *Ficus* may be traced. On data derived therefrom he arranges the Indo-Malayan species into two groups, the second of these being again divided into three subsidiary subgroups as follows :—

Ficus *Linn.*	Group I. Pseudohermaphrodite				*Palæomorphe.*
	Group II. Unisexual	Sect. 1.			*Urostigma.*
		Sect. 2.			*Synœcia.*
		Sect. 3.	A.	*Sycidium.*	
				Covellia.	
			B.	*Eusyce.*	
				Neomorphe.	

April 7th.—William Carruthers, F.R.S., President in the chair. Mr. Hunter J. Barron, Mr. James H. Dugdale, and Mr. Edward B. Poulton were elected Fellows of the Society.—Fresh specimens of a pure white variety of primrose, which had been gathered growing wild at Biarritz, France, by Mr. D'Arcy Godolphin Osborne, F.L.S., were exhibited, and Mr. J. G. Baker commented thereon.—Professor Huxley read a paper entitled "The Gentians: Notes and Queries." He introduced the subject by a few remarks wherefore his having been led to a study of the group, namely, abundance of *Gentiana purpurea*, *G. campestris*, *G. verna*, and *G. acaulis*, at Arolla, Rhone Valley, 6400 ft. above sea-level, and where he passed the autumn of 1886. Taking the flower as a basis, he divides the *Gentianeæ* into two great series, each of which is characterised by a peculiar disposition of the nectarial organs and a gradation of forms of the corolla from the deeply cleft, rotate, or stellate condition through the campanulate to the extreme infundibulate kind. In one series, his I. *Perimelitæ*, the nectarial cells are aggregated in a single or two patches; his second series, II. *Mesomelitæ*, are distinguished by a zone of secreting cells encircling the ovary, or by the absence of such, or of a honey-secreting surface which may exist in the central parts of the flower. Assuming on morphological grounds a hypothetical ancestral flower or Ur-Gentian, Haplanthe, this would lead on the one hand to the series of the Perimelitæ, comprising four types gradating or presenting modification of floral structure. 1. Actinanthe, whereof *Gentiana aurea*, with deeply cleft corolla, is representative; 2. Keratanthe, having the genus *Halenia* as typical; 3. Lophanthe, exemplified by *Gentiana Jamesonii*, and the genera *Frasera*, *Swertia*, and *Ophelia:* 4. Stephananthe, in which *G. Amarella*, with elongated campanulate corolla, gives the extreme of the perimelitous

series. On the other hand, the series of Mesomelitæ commence with — 5. Asteranthe, where corolla is rotate, markedly lobed and expanded, *G. lutea* and the genus *Eustoma* being typical; 6. Limnanthe, where the genus *Villarsia* offers a well-marked distinction; 7. The Lissanthe have short or gradate to long-tubed corolla, as traced from the genus *Chironia* through *Erythræa* to *Voyzia*; 8. In the Ptychanthe, where a truly infundibulate corolla obtains, *G. verna* and *G. purpurea* typify the extreme of mesomelitous differentiation. Such are the author's results as to the leading morphological modifications of the Gentian floral structure, which appear to bear a certain progressive relation in their evolution in the two series above mentioned. In treating of the geographical distribution of the Gentians, Prof. Huxley adopts the lines previously followed in his studies on animal distribution. Under Arctogea he includes Europe, Africa, Asia, and North America, as far as Mexico; South Africa, Madagascar, Hindostan, and Indo-China forming a subprovince, or the latter South Arctogea, and the rest of the province North Arctogea. Austro-Columbia comprises South America and the isthmus, to as far north as Mexico and adjacent islands. Australia comprises another province; and the last province New Zealand and adjacent islands. Species of the *Gentianeæ* are found in all of these provinces, the head-quarters being Arctogea and Austro-Columbia. The *Ptychanthe* are predominant in North Arctogea; the *Lissanthe* in South Arctogea; and *Actinanthe*, *Lophanthe*, and *Linanthe* Austro-Columbia. In Australia and New Zealand there is a paucity of species. He considers that the present distribution of the *Gentianeæ* is not to be accounted for by migration from any given centre, whence diffusion to their present localities. Borrowing analogy from zoological distribution, he inclines to the belief that the Gentians are like the genus *Tapirus*, at present only represented in South America and the Indo-Malay region, yet the *Tapirida* were widely distributed everywhere in the intermediate areas during the Middle Tertiary Epoch. Thus, notwithstanding that fossil remains of Gentians have not hitherto been discovered, the author suggests that in Pliocene and Miocene times their distribution was substantially similar to those now extant. Could the age of the first appearance of Diptera, Hymenoptera, and Lepidoptera, provided with long haustra, be indicated, then specialization of types and the problem of the distribution of the *Gentianeæ* might be approximately guessed.

April 21*st*.—W. Carruthers, F.R.S., President, in the chair.—Mr. W. Isaac Spencer was elected a Fellow of the Society. — Mr. E. M. Holmes exhibited specimens of various species of *Shorea* from Borneo and Sumatra, which plants yield vegetable fats used for technical purposes. Several species of *Dichopsis* affording gutta-percha from the bark, and fat from the seeds were also shown. Mr. Holmes pointed out the importance of the cultivation of the more valuable of these trees, among others *D. oblongifolia* and *Ceratophorus Leerii*, since they are being rapidly destroyed by the natives. Their cultivation has already been commenced by the

Dutch, but not a day too soon, as the trees take at least twenty years ere they are productive and valuable.—Mr. Patrick Geddes read a paper "On the Nature and Causes of Variation in Plants and Animals." The fact of organic evolution is no longer denied, but its physiological factors have not yet been adequately analyzed. Even those who regard natural selection as at once the most important and the only ascertained factor of the process, admit that such an explanation, being from the external standpoint, the adaptation of the organism to survive the shocks of the environment stands in need of a complementary explanation which shall lay bare the internal mechanism of the process, *i.e.*, not merely account for the survival, but explain the origin of variations. The relative importance of the external and internal explanations will moreover vary greatly in proportion as variations are found to be "spontaneous," *i.e*, in some given direction continuously. Avoiding any mere postulation of an "inherent progressive tendency" common to both pre- and post-Darwinian writers, the definite analysis of the problem starts with that conception of protoplasm which is the ultimate result of morphological and physiological analysis, *viz.*, to interpret all phenomena of form and function of cells, tissues, organs and individuals alike in terms of its constructive and destructive ("anabolic and katabolic") changes. While the external or environmental explanation of evolution starts with the empirical study of the effect of human selection upon the variations of animals and plants under domestication, the internal or organismal one as naturally commences with the fundamental rhythm of variation in the lowest organism in nature. It also investigates the nature of the simple reproductive variation upon which the origin of species as well as individuals must depend, before attempting that of individual variation. The interpretation of all the phenomena of male and female sex, as the outcome of katabolic and anabolic preponderance, is shown large to supersede the current one of sexual selection, and in some cases at least that of natural selection; *e.g.*, the specially important one of the origin of such polymorphic communities as those of ants and bees. In such cases natural selection acts not as the cause of organic evolution, but as the check or limitation of it, and acquires importance rather as determining the extinction than the origin of species. The process of correlation, especially that between individuation and reproduction, is mooted by the author, and its application to the origin and modification of flowers, &c., outlined. A discussion is given of the embryological and pathological factors of internal evolution, with an outlined application of the whole argument to the construction of a genealogical tree of plants and animals.

BLEPHAROSTOMA PALMATUM Lindb.

By W. H. Pearson.

(Plate 275).

Plantæ dioicæ, pusillæ, decumbentes, flavo-badiæ. Caules simplices furcative; ramis lateralibus. Folia succuba transversave, superiora imbricata, subopposita, complicata, ad angulum 55°, palmatim, quadrifida; segmentis subulatis spinosis; inferiora dissita, alterna, subquadrata, quadrifida; segmentis subulatis, integris, celluloso-articulatis; basi obsoleta nullave. Cellulæ parvulæ, quadratæ oblongæve. Foliola magna, foliis æquimagna et conformia. Bracteæ bracteolæque foliis supremis similes nisi majores. Perianthia obconica, sub-trigona, faciebus planis, unistriata, basi constricta, ore truncata, laciniato-spinosa. Caules ♂ minores, tenuiores, folia secunda, amplexicaulia, monandra, antheridia globosa, brevi stipitata.

Dioicous, ♀ terminal, growing in tufts with stems creeping, perianth erect. Stems simple or furcate, on the section 6 × 7 & 7 × 8 cells in diam., cortical layer of cells about 20, rather darker and firmer than the inner, which are almost hyaline; rootlets frequent, light brown or white proceeding from the base of the under-leaves; branches lateral. Leaves succubous or transverse, the upper ones imbricate, subopposite, complicate, keel at an angle of 55°, palmately quadrifid, narrow at the base; segments, which are more than half the length of the leaf, subulate and spinose, canaliculate in the broader portion; spines composed of 4 or 5 uniseriate long cells, and one or two rows of 2 and 3 cells at base; lower leaves distant, alternate, subquadrate, quadrifid; segments subulate, entire or slightly articulate, near base depauperate or wanting; cells smallish, quadrate or oblong; walls firm; no trigones. Under-leaves large, equal in size to leaves, inserted immediately below the subopposite pairs of leaves, similar in shape to them. Bracts similar to upper leaves, but larger, sometimes having a long basal marginal tooth. Bracteole the same, when young connate with the perianth. Perianth projecting above half beyond the bracts, obconical, becoming suddenly narrower near the base, frontally compressed, trigonous, the third angle postical, composed of one layer of cells near the middle from 100 to 120 cells round; on the upper (antical) plane face is an irregular seam where the two free margins of the bracts are soldered-up to form the perianth; mouth wide, truncate, laciniate-spinose, composed of 20 to 30 long spines of 3 to 5 long uniseriate cells, and one row of two cells at base. Calyptra oval to mitriform, 4 cells thick near base, and one near apex, where it is delicate; mouth, after rupture, lacerate and scariose; pistillidia oblong, 8 to 10, surrounding base. Capsule reddish brown, valves split down to base, texture thick, apparently composed of two layers; spores and elaters not seen. Male plants more slender, with very secund leaves. Andrœcia medial or terminal; perigonial leaves 4–8, more delicate, clasping the stem,

monandrous; antheridia globose, shortly stipitate. Barren stems often capitate.

Measurements. — Stems $\frac{1}{4}$–$\frac{3}{4}$ in. long, ·2–·3 mm. diam., near base of perianth ·3–·5 mm. diam.; leaves ·9 mm. long × ·6 mm. broad; segments ·6 mm. long, ·6 × ·4 seg. ·35, ·55 × ·4 seg. ·35; cells ·03 × ·02 mm., ·03 × ·03, ·03 × ·025; cells of spines ·06 mm. long × ·02 mm. broad, ·04 × ·02; bracts 1·0 mm. long × ·7 mm. broad, seg. ·7 mm. long; bracteole 1·0 mm. long × ·7 mm. broad, seg. ·7 mm. long; perianth 2·0 mm. long × 1·1 mm. broad at the middle, 1·2 mm. broad at the mouth, × ·4 mm. at the base; spines of the perianth ·15 mm., ·25 mm., ·3 mm. long; calyptra ·6 mm. high and ·5 mm. broad; pistillidia ·175 mm. long × ·05 mm. broad; apex of pedicel (base of capsule) ·25 mm. diam.; valves of capsule ·4 mm. long × ·2 mm. broad; perigonial leaves ·5 mm. long × ·35 mm. broad, seg. ·25 mm. long; antheridia ·15 mm. × ·16 mm.

Habitat.—Otago, New Zealand, inter *Hypnum rutabulum*, 1863, n. 13; Hector (Herb. Lindb.). Cambewarra, near Moss Vale, New South Wales; collected by Mr. C. Harris; communicated by Mr. T. Whitelegge, Sept. 1885.

Obs.—Differs from *Blepharostoma pulchellum* (Hook.) in its smaller size, leaves not so broad, with a narrower base, segments more rigidly spinose, not so long or finely ciliate, and the shorter broader perianth with 20–30 spines, not 50–60. From *Blepharostoma quadrifidum* (Mitt.) in the broader leaves, with the segments spinose, not merely dentate, and the broader perianth. *Blepharostoma quadripartitum* (Hook.) (*Jungermannia podophylla* Angstr., on the faith of a specimen lent me by Prof. Lindberg from the R. Acad. of Sc., Stockholm), is a smaller plant, with exactly transversely inserted leaves, which are oblong-quadrate; segments more than two-thirds the length of leaf, which have on both margins 6, 7, or 8 oppositely situated long teeth, the basal ones remarkably reflexed; the perianth has its mouth simply setose; in this species the perianths are distinctly trigonous, plicate at the mouth, which is *constricted* through the plication.

I am indebted to Drs. Carrington and Spruce for specimens and suggestions, employing the terms used by the latter (On Cephalozia, 1882).

I intended publishing this species as new, and as such forwarded it to Prof. Lindberg, who wrote me:—"Your species appears to be the same as my *Temnoma palmatum* (MSS. Oct. 10, 1876), which I picked out from a tuft of *Hypnum rutabulum*, from Otago, New Zealand." Being the same, I adopt the Professor's appropriate name.

Dr. Spruce merges Mr. Mitten's genus *Temnoma* into *Blepharostoma* of Dumortier. I was for a time inclined to dissent from this view, having in my mind the succubous insertion of the leaves of several of the species referred to this genus by Mr. Mitten; but a study of the perianths of *B. quadripartitum* (Hook.) shows that the character relied upon by Mr. Mitten (the wide mouth of the perianth) does not obtain, for they are more or less constricted by the plication at the mouth, so linking them with those of *B. trichophylium*.

Prof. Lindberg writes:—"I agree with Dr. Spruce and you in considering *Temnoma* = *Blepharostoma*. To the same genus I must refer *Jungermania setiformis*; the description of its colesule I copy from my manuscript.

"Colesula, infima basi excepta, ubique unistrata, superne subconica, ore angusto et longe ciliato, triangularis, angulo *postico* acutiore, ceteris duobus lateralibus obtusioribus, antice subplana, quæ facies antica basim format trianguli (in sect. transversa colesulæ) breviorem quam ceteræ ambæ lineæ inter se æquilongæ. Illa facies antica subplana, hæ tamam profunde et densissime plicata. Ad medium facierum interdum adest ala vel interna vel externa."

About the variety *alpinum* I am yet quite uncertain. Is it the male plant, or a proper species? It is always perfectly sterile, but grows, as between Drivstuen and Kongsvold, in Dovrefjeld (Norway), sometimes mingled with the type, yet forming proper tufts among those of the other. It seems constant, so it may be a proper species, being distinguishable by "parvitate, foliis minus densis, brevioribus, minus profunde sectis, lobis minus incurvis, brevioribus et latioribus, intus concavis, minus reflexis in marginibus fere integris, cellulis fere duplo minoribus, magis incrassatis, rotundo-quadratis, paraphyllis paucioribus et minoribus (*Blepharostoma subintegrum* Lindb. MSS.)."

DESCRIPTION OF PLATE 275.—Fig. 1. Plants nat. size. 2. Leaf and underleaf from upper portion of stem × 24. 3 & 4. Leaves × 24. 5. Basal leaf × 64. 9. Portion of leaf × 290. 7. Bracts and bracteole × 24. 8 & 9. Bracts × 24. 10. Bracteole × 24. 11. Perianth × 24. 12. Cross section of perianth × 24. 13. Portion of mouth of perianth × 64. 14. Pistillidium × 85. 15. Valves of capsule × 24. 16. Perigonial leaf × 64. 17. Antheridium × 64.

ON THE DISTRIBUTION OF PLANTS.*

BY AXEL BLYTT.

THE distribution of plants is essentially dependent on climate. We find, for instance, on the west coast of Norway many plants which are wanting in the inner and eastern parts, and these last have in return many which are missing on the coast. And in most continental mountain tracts we have a rich arctic flora.

These groups of species, more or less characteristic of certain climatic conditions, are, however, also more or less dependent on the nature of the substratum. On limestone and friable slates we find a flora different from that of the gneiss and granite. In restricting our researches to a limited area we may find many species peculiar to a certain substratum. The German botanist Unger spoke of "bodenstete" and "bodenholde" species. Some, the "kalkstete," were, for instance, found only on limestone;

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* Address to the Botanical Section of the Association of Scandinavian Naturalists, Christiania, July, 1886.

others, the "kieselstete," were peculiar to sîlicious rocks. But in extending the investigation over larger areas we see that only few species, if any, are everywhere growing on the same substratum. In the neighbourhood of Christiania some species are only found on calcareous ground, but almost all of them are found elsewhere in Norway on other rocks. Thus in different climates the same species have different relations to the nature of the substratum. Plants which demand much heat are often, in southern regions, independent of the nature of soil; in northern countries on the mountains, often, too, in the cooler coast regions, the same plants may be found on dry calcareous ground or on warm screes of different kinds of rocks facing the sun. And, again, plants of northern stamp as well as plants of the cooler coast regions, in warmer southern or eastern tracts, often grow only in damp cool places, on moist gneiss and granite rocks, on peat mosses, in shady places, &c. It is as though local conditions counterbalanced deficiencies in climate; or rather, there is in every tract a remarkable difference in the climate of its various localities.

Another circumstance which is of very great importance in determining the distribution is the struggle between the different species themselves. If the climate is favourable, species may grow in most unexpected places. In our moist coast tracts we sometimes find bog plants growing on steep rocky screes, nay, peat is often forming even on shelving slopes where, in drier climates, no peat would form. In the forest tracts of Eastern Norway there is many a weather-beaten hill-top, hundreds of feet below the upper limit of trees, and still bare of wood from exposure to wind and weather, and from want of vegetable soil. On such hills we sometimes find alpine plants, which shun the shade of trees. Several species grow on the mountains only where they are constantly moistened with snow-water; the sea-shores, the bogs, &c., have species peculiar to them. But we should be wrong in supposing these species to be able to grow only in the localities where they are naturally found. In botanic gardens they may all be successfully cultivated under identical conditions; nay, many plants which naturally only grow in very wet places thrive remarkably well in gardens without being watered more than others. Thus the influence of the struggle between species becomes apparent. When the gardener removes weeds and keeps off competitors, plants show themselves much less dependent on soil and moisture than in the wilderness of nature.

Light is of great importance in this struggle between species. Green plants are fond of light localities. Shady places, such as pine- and beech-woods, and the dense thickets, are poor in such plants. The places where the greatest number of flowering plants is found are rich in light. In Norway most of the rare phænogamous plants grow in the following localities: on slate and limestone rocks too poor in vegetable soil to be wooded; on the friable shales of our mountains where peat, heather, and lichen will not grow; on open shores, if the fjord-water is not too fresh; on shore cliffs, even on the gneiss and granite, where the vegetable

mould necessary for heather and wood is not yet formed; on sunny screes, if the thickets are not too dense; on woodless sandy downs, in the crevices of rocks; on open bogs, and in lakes not too deep and cold. But these localities are not everywhere equally rich in species. The screes and the limestone rocks of the coast and the slates of the coast mountains are much poorer in species than those of the inner fjords and eastern parts. It is quite otherwise with plants which are not green, and which are not fond of light. The hymenomycetous fungi, for instance, are fond of shade, and we find most of them in woods. The coniferous woods have species peculiar to them; the woods of deciduous trees have their species; other species grow in woods of both descriptions. Many fungi are only found under the shade of beech trees. I have found many of them in our two principal beech woods by Laurvig and north of Bergen. Tne woodless high mountains, on the contrary, appear to be poor in fungi, as far as our researches have yet gone. These plants are fond of shade and vegetable mould, and the mountains are poor in either.

There is a remarkable phenomenon concerning the distribution of species which must now be mentioned. In the distribution of many species, nay, even in that of whole groups, there are gaps, great distances separating the places where the same species or group of species grows. Thus oceanic islands situated in the middle of great oceans, and never having been connected with the continents, are inhabited by species which are related to, and sometimes identical with, those of the continents. Such islands, as was shown by Sir J. D. Hooker, have commonly many "endemic" species. In the Sandwich Islands are 669 species of vascular plants, not less than 500 of which are found nowhere else in the world, whilst 169 are found also in other parts. But even the species peculiar to the islands are more or less related to those of the continents, and we must thus conclude that the plants of such islands, or their ancestors, all immigrated from the continents in the course of time, though great oceans intervene between the islands and those continents from which they were stocked with plants. Thus we see that there must be means of transport for the seeds of plants from far distances. Migrating birds and oceanic currents no doubt are of greater importance in dispersing the seeds to far-off places than the winds.

Occupying ourselves for the present only with the wild flora, we do not speak of the influence of man, by which, voluntarily or involuntarily, plants migrate over large areas. Putting this influence of man aside, we may, from the very nature of the flora of these oceanic islands, infer that long transports are of rare occurrence. Experiments as to the floating faculties of seeds and fruits have shown that such long and sudden migrations must be exceptional. And we may safely infer that whole groups of species cannot migrate in this manner. Thus the flora of oceanic islands is comparatively poor in species. The island of Jan Mayen lies in a deep ocean, and has never been united to the continents; it has only a dozen phænogamous species possibly introduced on drifting

ice. The Galapagos enjoying a tropical climate have 310 phænogams, 174 of which are peculiar to them. Nor can these islands be supposed ever to have been connected with the continents. The Faroe Islands, though under a northern climate, have not less than 307 species, or as many as the Galapagos; but the Faroe Islands can boast of no species peculiar to them; their plants are almost all found in Scandinavia, and the remaining three or four species are also found in neighbouring countries. The same is the case with Iceland. Even the Greenland flora consists principally of Scandinavian plants. Well, between Greenland, Iceland, the Faroe Islands, and Scotland, there is a submarine bank; if this bank was lifted two to three hundred fathoms, Greenland would be connected with Europe. Plants would freely migrate along such a bridge. The North Atlantic, cut off from warmer seas, would be a cold ocean, and under such circumstances Scandinavia might be covered with an inland ice like that which is still found in Greenland. We know that Scandinavia had its Ice Age, and the hypothesis of a former connection between Greenland, Iceland, and Europe is thereby rendered more probable. This hypothesis is mentioned here only to meet at the outset an objection which might have been made to what I am about to say.

In marking on a map of Norway (or the whole Scandinavian peninsula) the parts where the different groups of species dominate with different colours, we observe that the same colour appears only here and there in patches which are largely separated by parts with another tint. We may divide our phænogamous plants into several main groups, *viz.*: (1) arctic species, in the most continental mountain regions; (2) subarctic, in the mountain slopes and forest glens; (3) boreal, lowland plants, fond of heat, and many of them restricted to the inner and eastern parts; and (4) Atlantic, coast plants, preferring the moist and mild coast regions. We might further divide these groups in two or three more, but for the present what has been said may suffice. The same groups of species are found also amongst the mosses. The Dovrefjeld, named by Schimper the "paradise of mosses," has a great many rare arctic mosses which are to be found also in other places where the phænogamous arctic flora prevails. The inner and the eastern lower parts have species of mosses wanting in the coast tracts, and finally the west coast, too, has many peculiar forms. From what is known about the distribution of fungi, there is no doubt but the same is the case with them. On the west coast, in the provinces of Christiansand and Bergen, we have already found many species not yet seen in the eastern parts of Norway, but found by E. Fries in Småland and other parts of Southern Sweden, where, too, are found most of the phænogams and mosses characteristic of the flora of Western Norway.

We have seen that single species may migrate at once to distant places, but the probability of a species being dispersed from one place to another varies, as remarked by Dr. Hult, inversely with the square of the distances. The seeds, moreover, are commonly transported only a short way by wind, running water, quadrupeds,

and birds; migrating birds, according to Prof. Collett, being commonly insectivorous, the resident birds are of greater importance in transporting the seeds of plants. We may conclude from all this that whole groups of species migrate only step by step, and not at once across large tracts of country.

From the gaps in the distribution of groups of species we are thus led to the conclusion that the present results from the past; in order fully to explain the present distribution of plants, the history of our flora must be considered. Geological revolutions of the past are reflected in the vegetation of the present; we must try to read and understand rightly what the plants tell.

It has been shown above that the distribution of plants seems to indicate that geographical changes between sea and land have taken place in recent geological time. We will now look at the climatic changes which may be inferred from the present distribution of plants, changes which were, at least partly, independent of the geographical ones.

Seeing how closely the present distribution depends on climate, we cannot doubt that a similar dependence prevailed in bygone days. In past times, too, the distribution was regulated by climate, soil, struggle with competitors, &c. Change of climate is the main cause of change of distribution. Such changes of climate were the cause of changes in the predilection of certain species for certain localities, and of changes of distribution in different regions. The observations of to-day show that common species which are peculiarly favoured by climate are often not at all particular about the nature of their localities, whilst rare species are commonly only found in a certain sort of habitat. If climate is altered, the commonest species have the greatest probability of surviving the change. We find near Christiania, especially in the subalpine region, still some of our coast plants. As I shall show hereafter, these are probably survivors of a bygone age. But these survivors are mostly species which are very common on the west coast—for instance, *Blechnum Spicant*, *Narthecium Ossifragum*, *Taxus baccata*, *Hylocomium loreum*, *Plagiothecium undulatum*, &c. The arctic plants which still grow in the lowlands belong, too, to the commonest ones. And amongst the heat-loving lowland plants the most common regularly go farther west than the rarer. If the climate should grow colder, southern species would by degrees become extinct. But they would especially survive in the hottest localities, in sunny screes, on limestone rocks, &c. And if the climate should become warmer, northern species would survive, especially in cool damp places.

Dr. R. Hult, of Helsingfors, has treated the distribution of plants (phænogamous and mosses) in Finland and South Sweden in several interesting essays. He has studied those changes in the distribution of plants which are going on, as it were, before our eyes. Local changes may in a moment destroy, partially or totally, the vegetation of a place; the burning of woods, the inundations of rivers, and the abandonment of cultivated ground, are causes of such changes. He distinguishes between changeable and unchangeable

localities. This point of view is of great importance in botanical geography, and has much to do with the question about the migration of plants.

In the soil of our woods we commonly find beds of charcoal—so commonly, indeed, that we are brought to believe that all our woods have been burned once or more in the course of time. As dry wood takes fire when struck by lightning, so, even in uninhabited countries, burnings may often take place in the primeval forests where old trees are allowed to rot on their roots. But such fires must have contributed to a great degree to the scantiness of the forest flora. If the fire is not restricted to the tops of the trees, but if the turf and the mosses of the ground take fire too, all plants of rarer occurrence and not provided with strong and enduring subterranean organs will easily be destroyed. If a pine wood is cut or burnt down, the first plants to invade the devastated ground will be the common one from the neighbourhood, and especially plants with winged and hairy seeds and fruits easily transported by wind, or those with fleshy fruits devoured by birds or other animals. Such species are the birch, the aspen, the mountain ash, *Epilobium angustifolium*, &c. The last one is called by Norwegian peasants, "Ild merke," which means "the token of fire," and has in Canada, for the same reason, the name of "fireweed." The pines and firs are thus replaced by other and more leafy trees. But these do not last long. The heavier seeds of the conifers immigrate step by step. The young pines and firs destroy, by overshadowing, the more light-loving trees, and at length regain their old ground. Newly-formed localities of this description are, as shown by Hult, invaded only by the commonest species from the neighbourhood. The same is the case in Norway; and we see, therefore, that long transports of seeds must be of very rare occurence. The phænogamous flora of our coniferous forests is very monotonous, and rarities are easily counted. The fungi, on the contrary, which are not in want of light, and which live for the most part of the year underground, and are accordingly less easily damaged by fire, are plentiful in our woods.

If migration from afar were a common thing, if the air were full of seeds and spores transported from a distance, we should expect open places where the ground is not overshadowed by trees and shrubs intercepting the falling seeds to be especially rich in rare species. As we have seen above, the places richest in phænogams are just such as these. But the above-named localities are less subject to changes than others. The scree continues as a scree through thousands of years. It grows slowly by stones falling from the rocky wall towering above, but the natural conditions remain essentially the same. The rocks and slate and limestone cliffs, poor in vegetable soil, are permanent localities, too. Lakes too deep to be changed into peat mosses are in the same case. The sea-shore is also a permanent locality. As the shore recedes or advances during the oscillations of land and sea, so the shore plants move with the shore-line. In this manner even arctic plants may be found on our present shores, which were in arctic times submerged.

If the rainfall changes in the course of time, the change must be the least palpable in the driest and the wettest places. Places with a mean degree of moisture must be most subject to change. All those places mentioned above must be considered to be unchangeable habitats. And thus it is clear that remains from old floras can survive only in such places. It is not because such localities are more accessible to seeds brought from distant places that we find them so rich; this is borne out by comparing them with places which have lost their flora by local events, and are invaded only by the common plants of the neighbourhood. And it is borne out still more clearly when we consider that rare mosses are most plentiful in hidden rock-crevices, and rare fungi in the depths of forests where the ground is not easily accessible to spores brought from a distance.

Though I do not profess to be a zoologist, I do not hesitate to state that even amongst the animals there are groups of species corresponding to the above-named groups of plants. Animals and plants are interdependent in many ways. There are many insects peculiar to our arctic province, and the Dovrefjeld is as interesting to the entomologist as to the botanist. Our west coast is said to yield to the naturalist insects wanting in the eastern parts, which have, in return, many forms not seen on the coast. The land-snails seem to be subject to similar laws of distribution as plants. Dr. Jordan has shown that many land-snails which in southern countries are independent of the substratum have their northern limits on limestone. Thus, I think, we may conclude that the geological events of bygone times are reflected in both the flora and the fauna of the present day.

The first naturalist who propounded this doctrine, at least as regards the plants, was Edward Forbes. He demonstrated that the Ice Age influences even the present distribution of plants. The Ice Age explains how the mountains of the temperate zone came to possess arctic species. During glacial times arctic plants flourished even in the lowlands of Middle Europe. As climate grew milder, they retired to the mountains and the arctic lowlands. Dr. Nathorst has confirmed this theory by the discovery of arctic plant-remains in the fresh-water clays of Middle Europe. But the theory of Forbes must be applied to all groups of plants having a scattered distribution, as, for instance, the flora of our west coast. This flora could scarcely immigrate across the North Sea; it has most likely come to us from South Sweden around the Christianiafjord at a time when the climate was milder than now. This theory is confirmed by the shell-banks described by Prof. M. Sars. At a time when the sea stood 50–150 ft. higher than it does now there existed in the Christianiafjord different fauna from the present—a fauna like that of the Bergen coast. We may infer from this that the climate of Christiania was then more like that of the coast; that the Atlantic flora, too, then flourished at Christiania; that this flora immigrated to our west coast from South Sweden, where most of its species still occur around the Christianiafjord, where we find only scanty remnants of it, especially in the subalpine regions,

and on gneiss and granite. At the same period Prof. Steenstrup has shown the coast oak (*Quercus sessiliflora*) was much more common in Denmark than it is now. And, finally, the peat bogs of Norway and Bohuslen (South Sweden) tell us that hazel and wild cherries (*Prunus avium*), which are both characteristic of the rich flora of the sunny screes, were once much more common than now. We find their nuts and stones in the peat of the bare and treeless western coast regions as well as in the bogs of the monotonous pine woods of the eastern country, in places far from those where hazel and wild cherries now grow. From this we conclude that the flora of the sunny screes, with all their beautiful shrubs and trees, lime, beam trees, maple, elm, hazel, ash, apple, roses, &c., and all the rare herbaceous plants which grow with them, is a remnant of bygone glory, from an age when Southern Norway was much richer in tender deciduous trees than it is to-day, and when the species growing with them were also more plentiful. In this manner our hypothesis is strengthened by the shell-banks, the clays, and the peat. The unchangeable localities are asylums for frequenters of the floras of bygone days.

As to the number of such changes in climate, plants alone give no safe clue. We must take into consideration the alternating strata of peat-bogs, and the different levels of river-terraces and old shore-lines, which I suppose to be due to the same periodical changes of climate.* This is not the place in which to dwell more fully upon the probable cause of these changes. We know that the procession of the equinoxes causes the length of winter and summer to change every 10,500 years. In 10,500 years winter is longer than summer, in the next 10,500 summer is longer than winter, and so on. The difference between the two seasons may rise to more than thirty days, when the eccentricity of the earth's orbit attains its highest value. And, moreover, we know, as shown by Prof. Mohn, that in the North Atlantic the average strength of the ruling south-west winds is almost thrice as great in winter as in summer. From the researches of Zoppietz it appears that ocean-currents are the effects of the ruling winds; the strength of the current depends on the average force of the prevailing winds in the last great space of time. If in 10,500 years there are many thousand winter days more than in the preceding and succeeding period, there must also be much more south-west wind, and consequently during such periods the warm current which washes our shores and makes our climate so mild must alternately grow stronger and weaker. Thus I believe the procession of the equinoxes to be a natural cause of such changes in climate as those we have bespoken above, and that the distribution of species is essentially governed by the periodical changes of the earth's orbit.

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* *Cfr.* A. Blytt, "On Variations of Climate in the course of time," in 'Nature,' July 8 and 15, 1886. London.

NEW AND INTERESTING PLANTS FROM PERAK.

By W. Botting Hemsley, A.L.S.

Until within the last three or four years nothing much was known concerning the vegetation of Perak, a district lying a little south of Pulo Penang, except that it was very luxuriant and varied; but large collections have been made there recently, primarily at the instigation of Sir Hugh Low, the British Resident. The most extensive, however, as mentioned in a recent number of this Journal, was that formed by the late Father Scortechini. The new species described below are in one of several collections sent to Kew by Mr. Leonard Wray, jun., Curator of the Perak State Museum; but, in order to avoid clashing, as Dr. G. King, Superintendent of the Calcutta Botanic Garden, is engaged upon a Flora of Perak, it is not intended to proceed with the description of any further novelties.

Unona stenopetala Hook. f. & Thoms. Mr. Wray collected fruit of this, which was previously unknown.

U. carpella (dua tantam adsunt) subsessilia, depresso-cylindrica basi apiceque omnino truncata circiter 8 lineas longa et 6 lineas lata, undique dense ferrugineo-tomentosa.

Previously collected in Moulmein and Singapore.

Kenring, 558.

Hibiscus floccosus Mast. Pluss River, 551.

"Large tree; flowers yellow."

This handsome tree was previously only known from Mount Ophir, Malacca, where Maingay collected it. It is allied to the widely-dispersed *H. tiliaceus* L. (*Paritium*), yet sufficiently distinct to be recognised at a glance.

Agelæa Wallichii Hook. f. var. vel species affinis. River Pluss, 48.

"Climber; fruit light red; seed red with black spot."

The foliage of Mr. Wray's specimen is so like typical *A. Wallichii* that we forbear describing it as a new species, although the seed-vessel and seed present differences which would seem to justify such a course. The capsule is merely rugose, not tubercled, and the seed, which is from seven to nine lines long, is invested in a distinct fleshy aril four-fifths of its length, and the black hard crustaceous testa can hardly be described as thin. We suspect that the fruit of the original specimens is in a much younger state. *A. Wallichii* is restricted to the peninsula.

Anisophyllea disticha Hook. Waterfall Hill, 2500 ft.; 17.

These are the first specimens of this species that we have seen with the fruit attached.

Begonia (§ Petermannia) **Wrayi** Hemsl., n. sp.—*B. isopteræ* affinis sed caulibus gracilioribus foliis tenuioribus floribus minoribus et alis capsulæ angustioribus. Herba vel suffrutex erectus, 3-pedalis, undique glaber vel cito glabrescens, caulibus ramulisque gracilibus. Folia graciliter petiolata, membranacea, oblique ovato-oblonga, absque petiolo 3–6 poll. longa, usque ad 2¼ lata, longe acuminata, acutissima, superne grosse paucidentata simul denticulata; petiolus

usque 1 poll. longus; stipulæ lineares, acutæ, 6–9 lineas longæ. Flores albi in cymas parvas subsessiles subterminales dispositi; masc. 2-sepala, sepalis ovato-rotundatis vix 3 lineas longis; fem. perianthii lobi 5 inæquales denticulati subacuti, longiores 6–7 lineas longi. Capsula oblonga (immatura tantum visa) circiter 9 lineas longa et 5 lineas lata, æqualiter 3-alata.

Ulu Kenring, 55.

"About three feet high; stalks of leaves red; flowers white."

Adina rubescens Hemsl., n. sp.—Arbor magna (fide Wrayi) ramulis ultimis crassiusculis glabris rugosis, internodiis brevissimis. Folia breviter petiolata, subcoriacea, ovata, cum petiolo usque ad 4 poll. longa, acuminata, obtusiuscula, basi cuneata vel fere rotundata, venis primariis lateralibus utrinque sæpius 9, subtus elevatis atque costa rubescentibus (saltem in siccis). Cymæ sæpius 3-capitatæ, breviter stipitatæ (stipes sæpius 3–4 lineas longus), pedunculis gracillimis 9–12 lineas longis; capitulæ vix ½ poll. diametro. Flores numerosi, puberuli, bracteolati; calycis lobi oblongi, obtusi.

Ayer Larut, 539.

Larger tree; flowers greenish yellow. A very distinct species.

Acranthera mutabiiis Hemsl., n. sp. — *A. Griffithii* affinis, differt corollæ lobis late ovatis, &c. Frutex vagans, ramis lenticellatis glabrescentibus. Folia longe petiolata, fere membranacea, glabrescentia, late ovato-elliptica, utrinque longe attenuata, acuta, cum petiolo usque ad 11 poll. longa, venis primaris lateralibus 7–8 conspicuis arcuatis. Flores flavi deinde coccinei, 2–2½ poll. longi in cymas parvas densas terminales dispositi; calycis lobi lineares acutissimi 6–8 lineas longi; corolla infundibuliformis extus hirsuta, lobis late ovatis intus pulverulentis, tubo intus barbato.

Waterfall Hill, 2000 ft., 91.

"Straggling bush; flowers yellow, changing to red."

Didymocarpus albomarginatus Hemsl., n. sp. — Herba caulescens caulibus petiolisque pilis sericeis purpureis (saltem in siccis) dense vestitis. Folia opposita, longe petiolata, crassa, coriacea, mollia, ovata, absque petiolo 2–3 poll. longa, obtusiuscula, basi obtusa vel rotundata, integra, albo-marginata (fide *Wrayi*) supra sparse pilosula, subtus præsertim juxta marginem dense sericeo villosa; venis primariis lateralibus utrinque 7–9 conspicuis; petiolus crassus, usque ad 1¼ poll. longus. Flores albo-flavi (fide *Wrayi*), hirsuta, 6–8 lineas longi, breviter pedicellati; cymæ 2–5-floræ, pedunculatæ; pedunculi axillares, usque ad 6 fasciculati (ex eadem axilla continuatio pedunculorum) foliis breviores; calycis segmenta linearia; corollæ ore obliquo, labio superiore brevi. Capsula circiter pollicaris.

Waterfall Hill, at about 2500 ft., 65.

Pellionia Daveallana N. E. Brown in Gard. Chron. n. s. xiv. p. 262; Ill. Hort. xxix. p. 189, t. 472. Kenring, 57.

This plant, recently described and figured from cultivated specimens derived from Cochin China, proves to be the same as *Procris gibbosa* Wall., doubtingly reduced by Weddell (DC. Prodr. xvi. p. 183) to *Elatostema cornuta* Wedd.

Salix tetrasperma Roxb. Pluss River, 546.

This willow has a wide range in India and Malaya, descending, according to Kurz ('Forest Flora of British Burma,' ii. p. 493), down to the tidal forests of Pegu and Tenasserim.

Arisæma (Pedatisecta) **Wrayi** Hemsl., n. sp. — *A. filiformi* affinis differt foliolis 7–9 angustioribus, &c. Planta $1\frac{1}{2}$—2-pedalis. Rhizoma sphæroidea, fibrosa. Folia a basi libera, pedata, 7–9-foliolata, glabra; foliola petiolulata, membranacea, anguste lanceolata (lateralia leviter obliqua), inæqualia, 5–7 poll. longa, caudato-acuminata, basi cuneata, venis primariis lateralibus paucis distantibus tenuibus; petioluli graciles, folioli intermedii usque 12–15 lineas longis. Pedunculus ut videtur aphyllus, basi cataphyllis 1–2 vestitus cum spatha folia æquans vel excedens. Spathæ tubus subcylindricus, circiter 2 poll. longus; limbus ovatus, acuminatus, acutus, circiter 3 poll. longus, basi recurvus, auriculatus, auriculis rotundatis. Spadix filiformis spatham 1–2 poll. superans, femineo supra ovaria staminodiis paucissimis, subulatis recurvatis instructo.

Birch's Hill, 30.

"Flowers [spathes] lilac or white; fruit red; stalks of leaves mottled."

Arisæma (Trisecta) **anomalum** Hemsl., n. sp.—*A. laminato* affinis differt spathæ lamino basi auriculato, &c. Planta vix pedalis. Rhizoma parva radicibus fibrosis minuta. Folia a basi libera, trifoliolata glabra; foliola breviter petiolulata, membranacea, oblongo-ovata (lateralia obliqua) 3–5 poll. longa, sursum attenuata, apice filiformia, basi rotundata, margine integra, venis primariis lateralibus utrinque sæpius prope marginem anastomosantibus. Pedunculus aphyllus, folia vix æquans, infra medium cataphyllis 2 vaginantibus vestitus. Spathæ tubus oblongus, circiter $1\frac{1}{2}$ poll. longus; limbus ovatus, acutus, vix 1 poll. longus, basi auriculatus, auriculis rotundatis. Spadix masculus mediam laminam attingens, subulatus.

Hill, Garden Larut, 70.

"Flowers [spathes] white shaded with lilac; fruit red."

This and perhaps the preceding differ from all the other species of the genus that we have seen in the leaves being quite separate from the peduncles, instead of their petioles sheathing them. This species is near *A. laminatum* Blume, but independently of the peculiarity mentioned it is easily distinguished by its auricled spathe, &c.

Alocasia perakensis Hemsl., n. sp.—Planta pedalis caudice adscendenti. Folia longe petiolata, crassa, peltata, rhombeo-oblonga, absque petiolo 6–8 poll. longus caudato-acuminata, lobo antico brevi subtruncato vel breviter bidentato, venis primariis lateralibus utrinque (2 inferioribus rectis inclusis) 5 crassiusculis; petiolus usque ad 6 poll. longus, basin versus subite dilatatus, amplexicaulis. Pedunculus petiolum æquans vel leviter excedens, basi bracteis amplis 2–3 poll. longis instructus. Spatha crassiuscula, angusta, acuta, vix 2 poll. longa. Spadix perfectus non visus. Fructus ruber, pisiformis, 1–2 spermus.

Birch's Hill, 29.

"Flowers white; fruit red."

LECANOPTERIS CARNOSA Blume. Birch's Hill, 587.

Of this remarkable fern Mr. Wray collected fronds and a portion of the singular fleshy rhizome, of which there was previously no specimen in the Kew Herbarinm.

297*. **Polypodium** (PHYMATODES) **Wrayi** Baker, n. sp.—Rhizomate gracili late reptante, rhizomatis paleis densis lanceolatis acuminatis membranaceis ferrugineis ciliatis, frondibus parvis biformibus simplicibus, sterili oblanceolato obtuso glabro crasso coriaceo distincte stipitato venis reticulatis immersis occultis, fertili longiori lineari stipite longiori, soris medialibus globosis superficialibus.

Sterile frond 1–1½ in. long, ¼–⅓ in. broad, with a naked stipe 6–15 lines long. Fertile frond 2–3 in. long, ⅛–⅙ in. broad, with a longer stipe.

Belongs to the group of which *P. lineare* is the best known representative, and falls in beside *P. subcostatum* and *P. accedens*.

Perak; Gunong Hijan, 4600 ft., 573.

NOTES ON *ISOETES*.

By ARTHUR BENNETT, F.L.S.

IN the first volume of this Journal, Prof. Babington records the discovery of *Isoetes echinospora*, giving an interesting account of a journey to Wales with M. Gay, of Paris, and the late Rev. W. W. Newbould, for the purpose of studying the genus; also asking for any notes on the genus. Last year Dr. Caspary, of Könisberg, wrote to me, and asked for the loan of my specimens, as he was studying the distribution of the genus in Europe. These he has lately returned, accompanied with some notes on the several examples; these others than myself may be interested in, and I give them in Dr. Caspary's own words.

1. ISOETES LACUSTRIS.—Salop 11, 1883, *W. E. Beckwith*. A new station. "For this late season the macrospores are very smooth; perhaps *leiospora* Kütz. Further research necessary," *Dr. C.*

2. ISOETES.—Loch near Bangor, N. Wales, 1884, *J. E. Griffith*. "Doubtless *I. lacustris* f. *longifolia*. Also further research necessary whether this is *leiospora*. The spores are very little warty," *Dr. C.*

3. ISOETES LACUSTRIS.—Bangor, 1884, *J. E. Griffith*. "I scarcely doubt that this form, which is *falcata* Tausch., 1832, is at the same time *leiospora* Kütz. Spores nearly smooth," *Dr. C.*

4. ISOETES LACUSTRIS.—Carnarvon, 1876, *G. C. Druce*. "*I. lacustris* f. *stricta-elatior*," *Dr. C.*

5. ISOETES.—Lake Taelygn, Carnarvon, 8, 1878, *E. M. Holmes*. "*I. lacustris* f. *subinervis*, *stricta*, *elatior*. Macrospores one, which was hidden among the roots, and probably from the offspring of another plant, nearly smooth, very little warty. Ripe? or var. *leiospora* Kütz.," *Dr. C.*

6. Isoetes lacustris.—Loch near Carnarvon, 1884, *J. E. Griffith.* This seems to keep different; it is more slender, and longer. I think it is much larger about the middle of the lake in deep water; can it be *I. Morei?*, *J. E. Griffith in litt.* "*I. lacustris* f. *stricta, elatior*," *Dr. C.*

7. Isoetes lacustris. — Llyn Ogwen, near Bettws y Coed, N. Wales, 1879, *W. W. Reeves.* "*I. lacustris* f. *falcata* Tausch., 1832. Macrospores nearly smooth, ripe, or *leiospora* Kütz. Further remark necessary," *Dr. C.*

8. Isoetes lacustris. — Llyn Padarn, Carnarvon, 24, 8, 75. *J. H. Lewis.* "*I. lacustris* f. *patula, subplicata.* Spores nearly smooth, unripe? or var. *leiospora?* Further remark necessary to try whether these spores germinate," *Dr. C.*

9. Isoetes. — Loch by Loch Brandy, Forfar, 7, 56, *A. Croall.* "Habit of that of *I. lacustris* f. *strictior, elatior* et *longifolia.* Time of collecting too early for spores," *Dr. C.*

10. Isoetes. — Loch by Loch Brandy, Forfar, 7, 54, *A. Croall.* "*I. lacustris* f. *vulgaris, stricta, elatior* et *longifolia*," *Dr. C.*

11. Isoetes. — Loch Caender, Callater, Aberdeenshire, 7, 83, *W. F. Miller.* "The habit of this plant is *I. lacustris* f. *stricta, elatior.* Spores not there," *Dr. C.*

12. Isoetes. — Loch Caendor or Kandor, Braemar, 7, 56, *A. Croall.* "The spores either too young, or if ripe (?) *leiospora* Kütz., because they are nearly smooth. Riper spores or material collected later in the year to be examined for f. *stricta, elatior*, and *patula*," *Dr. C.*

13. Isoetes Morei D. More.—Lough Bray, Co. Wicklow, Ireland, 8, 78, *Prof. Dickson.* "I kept the other specimen, which you kindly permitted. According to the macrospores of that, which are exactly those of *I. lacustris, vulgaris*, by form and size, I doubt that *I. Morei* is only else than a f. of *I. lacustris.* Wants closer research in Lough Bray," *Dr. C.*

14. Isoetes echinospora.—Llyn Tecwyn Isaf, N. Wales, *W. W. Reeves.* "Prickles of the macrospores unusually short," *Dr. C.*

15. Isoetes echinospora. — Boffin Island, Co. Galway, 1875, *A. G. More.* Passed by Dr. Caspary without comment.

16. Isoetes echinospora. — Loch of Park, near Aberdeen, Oct., 1862, *Messrs. Brown & Kerry;* comm. *J. Sadler.* Passed by Dr. Caspary without comment.

During the present summer and autumn, if anyone gathering the genus will transmit specimens to me, I will gladly next winter submit them to Dr. Caspary; but, as usual with continental authorities, he complains much of the "wretched condition you botanists gather aquatic specimens in." Those botanists who have had the pleasure of using or seeing the splendid specimens of aquatic plants distributed by Dr. Tiselius, of Stockholm, will not wonder at these complaints of our gatherings.

REMARKS ON *PYRUS COMMUNIS* c. *CORDATA* Desv.

By T. R. Archer Briggs, F.L.S.

I have a tree of *Pyrus cordata* Desv. Lond. Cat. ed. 8, *Briggsii* Syme, ed. 7, in the grounds here at Fursdon, Egg Buckland, which is now 14–15 ft. high, and has this spring borne a considerable number of flowers. It is one of the three bushes mentioned in 'Flora of Plymouth,' p. 147, as raised by me from some seeds of fruits gathered late in the year 1875 from the wild bushes in the hedge between Thornbury and Common Wood, whence I have in past years obtained and distributed through London Bot. Ex. Club a number of specimens of this pear. Another of the three plants I took to Kew in the spring of 1879, when it was planted in the Arboretum there, but I have not since ascertained whether it has thriven or not; possibly after reading this some London or Kew botanist may think it worth while to see when next in the Gardens. The third bush died in my possession some years ago, I fear through having been planted in an uncongenial position. The tree now growing here flowered for the first time in the spring of 1885, so nine years from the one in which the seed vegetated; it, however, then produced only three or four cymes.

This tree shows some divergence from the wild bushes, although it has not had any treatment of a nature to influence its characters, beyond having been planted-out in a shrubbery lying at a lower elevation than the spot where the parent bush grows, which is an exposed hedge. The leaves and flowers of my tree are somewhat larger than in the wild one, coming of course in these respects nearer those of our cultivated pears. Its flowers are about 1 in. across, and have white petals, with a less dense and shorter coating of woolly hairs on the calyx. The cymes retain fully as racemose-like arrangement of the blossoms. I hope my tree will produce some fruits which, from their being so very small and peculiar in the wild bushes, would furnish an interesting and important point for comparison.

Since my 'Flora of Plymouth' was published I have ascertained that this supposed *Pyrus cordata* Desv. occurs in a third place in Egg Buckland parish—an exposed hedge on Derriford Estate, by the road from Crown Hill to Stoneybridge, half a mile from the station lying between Thornbury and Common Wood, and nearly one mile from that of Coleridge Lane (Fl. Plym. pp. 146, 391). Here it was first detected last year by my nephew, F. J. Briggs; when there were two or three low bushes in the hedge itself, and some dozens of smaller ones on and about it, these latter bushes extending interruptedly for about 16 yds. on the road-side of the bank, and for about 20 yds. on the field-side. Since then those on the road-side have been pared down, doubtless only to shoot up again. As in the case of the Coleridge bushes, I assign them to the so-called *P. cordata*, without having seen flowers. A tendency to readily produce suckers belongs to this pear. The great similarity of its

foliage and branches to those of *Pyrus acerba*, which is common in our hedges, makes it likely to be overlooked, especially as from one cause or another flowers are rarely seen on its boughs.

The differences shown by my tree from its parent, appearing as they have in one generation only, increase, I think, the probability of this wild pear of the neighbourhood of Plymouth being here a degenerated product of some cultivated variety of the pear rather than a truly indigenous one; for, considering the treatment my tree has had, reversion to an earlier, though artificial, state must I think be assumed rather than variation under altered conditions. I should not be surprised to hear that the tree at Kew shows less divergence from our wild ones, for when quite small that now growing here bore the largest leaves of my three young plants. The flowers producing the seeds whence they sprung were not likely to have been fertilised in any way with pollen from some cultivated pear, since the wild bushes flower so remarkably late as to be in blossom simultaneously with our apple rather than our pear trees; moreover, they were borne away from houses and gardens.

Before I lay down my pen, it may be worth while to add that I have here trees of *Pyrus latifolia*, Syme, growing near the pear tree, 10–12 ft. high, raised from seed of Devon bushes. They have not yet flowered, but in all respects retain precisely the appearance of their wild parent-bushes.

ON A NEW IRISH HEPATIC.

By Richard Spruce.

Radula Holtii, n. sp. — Dioica, humilis, rufula vel olivaceo-viridis, caule reptante vix semipollicari paucirameo, ex parte subpinnato, ex parte dichotomo. Folia contigua vel subdissita, a basi decurrente complicato-saccata, carina ad angulum 45° subrecte ascendente vel convexa, abrupte late patentia, oblique late oblonga rotundata, plana vel subconcava, repanda, longe incurrentia, angulo basali caulem haud obvelantia; lobulus triplo brevior, trapeziformis, obtusus vel subacutus, subplanus, solum ad carinam inflatus, in caule alte incurrens, haud transiens; cellulæ parvæ æquilateræ, opacæ vel subpellucidæ, ad angulos haud incrassatæ. Flores terminales, innovatione unilaterali, vel duabus oppositis, suffulti. Bracteæ sæpius unijugæ, erectæ, sese arcte imbricantes, ad medium bilobæ, lobo majore late obovato, lobulo vix duplo breviore subrotundo. Perianthia alte emersa, tenuia, subincurva, tubæformia vel claviformia, ubique fere teretia, solum apice perpaulo compressa, ore truncato obsolete 4-lobo. Andrœcia in ramis terminalia; bracteæ 2–3-jugæ, nisi pro lobulo submajore foliis vix diversæ, parum turgidæ, diandræ.—*Folia* ·8 × ·6, *lobulus* ·25 × ·3, *cellulæ* $\frac{1}{55}$; *bracteæ lobus* ·6 × ·4, *lobulus* ·37 × ·35; *perianthia* 2·1 × ·3 (*ore*) × ·15 mm. (*infra medium*).

Hab. Prope cataractam *Torc Waterfall* Hiberniæ dictam, in aliis hepaticis, *Dumortiera irrigua*, *Jubula Hutchinsiæ* et *Lejeunea Mackaii* præcipue repens, a cl. G. A. Holt, mense Junio, 1885, rarissime lecta.

A few months ago, whilst occupied in disentangling the plants of *Lejeunea Holtii*, n. sp. ('Journ. Bot.' Feb. 1887) from other hepatics with which they were interwoven, I picked out three or four stems of a slender *Radula*, which could hardly be the young state of the *R. Carringtoni* that grew copiously along with it, or of the common *R. complanata*. I requested Mr. Holt to look for more of it among his Killarney gatherings; he did so, and found it creeping very sparingly on *Jubula Hutchinsiæ* and decaying fronds of *Dumortiera*, but so fragile as to be almost impossible to detach without rupture. Plants of both sexes were present, and he has at length succeeded in finding a perfect perianth, which has enabled me to complete the foregoing description. The perianth, indeed, affords the most important character, sufficing alone to distinguish this *Radula* from every other European species. It is slender, trumpet-shaped, perfectly terete except at the mouth, where it is very slightly compressed; whereas in all our other species it is more or less lineari-campanulate, and so much compressed (except at the very base) as to be almost or quite complanate. Very few tropical *Radulæ* have a similarly terete perianth. I gathered but one such, *R. Cornucopiæ*, n. sp., Hep. Am. et And., whose slender gently-curving perianth, however, is abruptly dilated at the mouth into a spreading limb, like that of a "horn of plenty": a character quite wanting to *R. Holtii*. *R. Cornucopiæ* is, besides, one of the giants of the genus, growing to 4–6 in., whereas the stems of *R. Holtii* barely reach half an inch. *R. flaccida* L. et G., a foliicolous species abounding on the Amazon, has long, slender, truncate perianths, terete in the lower, compressed in the upper half; but the leaves differ much from those of *R. Holtii*, especially in the large, rhombic lobules. The leaves of *R. Holtii* differ from those of other European species in having the complicato-saccate base decurrent at an angle of 45°, and the major lobe divergent from the apex of the fold; but in *R. complanata* and its near allies the lower margin of the major lobe is continuous in direction with the fold. Small forms of *R. pallens* and a few other tropical species have sometimes not dissimilar foliage, but all have flattened perianths. Franz Stephani, who has made a special study of *Radula*, thinks that, as to the leaves and general habit, the nearest ally of *R. Holtii* is *R. appressa* Mitt. (from Rodriguez Isle), a species I have not seen. Of British species it could only be mistaken for *R. Lindbergii* Gottsche (= *R. germana* Jack et *R. commutata* Gotts.), of which it has the dioicous and innovant inflorescence, but whose leaf-lobule is larger and squarer, and the fold not decurrent nor divergent from the margin of the major lobe as it is in *R. Holtii*; while the perianth is complanate.

I take this opportunity to supply an omission in the text of 'Hepaticæ Amazonicæ et Andinæ.' On page 314, in the description of the subtribe *Raduleæ* and its solitary genus *Radula*, where it is

said "*Flores* . . . . in unica specie cladogeni, ramulo simplicissimo constantes," after "specie" add "Æquatoriali-Americana." It is true that I had gathered only a single cladogenous *Radula* (*R. Gottscheana* Tayl.) in tropical America, all the other species being acrogenous, but when I drew up the generic character I had probably forgotten that many years previously I had noted and described in my MS. the cladogenous inflorescence of our British *R. aquilegia* and *complanata*. In *R. aquilegia*, indeed, I have never seen any female flower—whether borne on a short or a long branch, or at the apex of the stem—subtended by an innovation. But in *R. complanata*, although most of the fertile (and in this case bisexual) branches are perfectly simple, there is occasionally present an innovation at the outer base of one of the two bracts adjacent to the perianth.* In the nearly allied *R. Carringtoni*, on the contrary, however short may be the female branch, the flower is invariably accompanied by an innovation. The perfect perianth of this last, and most beautiful species, is still a desideratum, but I have lately found a half-grown perianth on a Killarney specimen which may be thus described: "Perianthium (juvenile) compresso-campanulatum, bilabiatum, labiis retusis." The full-grown perianth is doubtless more elongate, but otherwise not sensibly different.

SYNOPSIS OF *TILLANDSIEÆ*.

By J. G. Baker, F.R.S., F.L.S.

(Continued from p. 177).

6. Tillandsia Linn.

(*Renealmia* (Plumier) Linn. Gen. ed. i.).

Sepals free to the base, oblong or oblong-lanceolate, connivent or imbricated. *Petals* free, unguiculate; blade spreading, obovate or oblong; claw naked or appendiculate with a pair of scales. *Stamens* hypogynous or 3 inner shortly adnate to the claw of the petals, shorter or longer than the petals; filaments filiform; anthers linear or linear-oblong. *Ovary* free, ampullæform, 3-celled; style filiform, long or short; stigmas short, not twisted. *Capsule* coriaceous, septicidally 3-valved, clavate or fusiform. *Seeds* narrow, crowded, erect, with a mucronate appendage and long funiculus splitting up into fine threads. — Habit very various. Leaves usually rosulate, either thick and densely persistently lepidote or broader, thin and nearly glabrous. Spikes distichous, rarely reduced to a single flower, or multifarious, simple or panicled, each flower subtended by a persistent coriaceous bract. Corolla white, yellow, or red-violet.

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* It is to be noted that the subfloral innovation in *Radula*, when it exists, is never so distinctly and conspicuously adnate to the adjacent bract as it is in *Lejeunea*.

KEY TO THE SECTIONS OF TILLANDSIA.

* *Leaves spaced-out on a long stem.*

1. STREPSIA.—Stems pendulous, filiform. Flowers solitary in the axils of the stem-leaves.

** *Leaves crowded, rosulate, coriaceous, acuminate, densely lepidote.*

† *Inflorescence distichous.*

2. DIAPHORANTHEMA.—Leafy stem short. Leaves subterete. Flowers 1 or few. Style and stamens short.
3. PHYTARHIZA. — Leaves rosulate. Flowers spicate or panicled. Petal-blade broad, spreading. Style and stamens short.
4. PLATYSTACHYS.—Leaves rosulate. Flowers spicate or panicled. Petal-blade lingulate. Stamens and style longer than the calyx.

†† *Inflorescence multifarious.*

5. ANOPLOPHYTUM.—Leaves rosulate, narrow, acuminate. Flowers spicate or panicled.
6. PITYROPHYLLUM.—Leaves rosulate. Flowers in a capitulum in the centre of the rosette of leaves.

** *Leaves rosulate, broader and thinner, obscurely lepidote.*

† *Inflorescence distichous.*

7. ALLARDTIA.—Differs from *Platystachys* only in leaf.
8. WALLISIA.—Differs from *Phytarhiza* only in leaf.
9. VRIESEA.—Leaves broad, usually lorate. Petals with two scales on the claw, large, white or yellow.

†† *Inflorescence multifarious.*

10. CYATHOPHORA.—Differs from *Allardtia* in inflorescence.
11. CONOSTACHYS.—Differs from *Vriesea* in inflorescence.

Subgenus I. STREPSIA (Nuttall). — Stems pendulous, filiform. Leaves spaced-out, filiform, densely furfuraceous. Flowers small, usually solitary. Style short.

1. T. USNEOIDES Linn. Sp. Plant. 411; Roem. et Schultes Syst. Veg. vii. 1199; Beer Brom. 151; Hook. fil. in Bot. Mag. t. 6309; E. Morren in Belg. Hort. 1877, t. 17. — Stems filiform, flexuose, pendulous, reaching a length of 15–20 ft. Leaves distant, spreading, filiform, 1–3 in. long, clothed like the stem with silvery lepidote scales. Flowers axillary, generally solitary, sessile in the dilated ovate base of a leaf; bract ovate, shorter than the calyx. Calyx $\frac{1}{4}$ in. long; sepals oblong-lanceolate, naked, pale green, conspicuously striated. Petals yellow; protruded claw lingulate, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Stamens as long as the calyx. Style short. Capsule about an inch long.

Hab. Throughout Tropical America from Florida and Mexico to Chili and South Brazil. *T. trichoides* H. B. K. and *T. crinita*

Herb. Willd., both kept up as distinct species by Beer, appear to be mere forms of *usneoides*.

Subgenus II. DIAPHORANTHEMA (Beer). — Leaves spread over a short stem, subulate, densely lepidote. Peduncle leafless or obscurely bracteate, sometimes 0. Flowers 1 or few. Petals violet, not scaled on the claw. Stamens and style short.

I have nothing material to add to the synopsis of the species of this subgenus I gave in the 'Journal of Botany' for 1878, pp. 236 to 241. They are as follows:—

Dwarf species with leaves not more than $\frac{1}{4}$–$\frac{1}{2}$ in. long.

2. *T. bryoides* Griseb.; Baker *l. c.* 236. — Parana, South Brazil and Argentine territory. I cannot, by the description, separate *T. polytrichoides* E. Morren in Belg. Hort. 1880, 240, collected in South Brazil by Glaziou.

3. *T. tricholepis* Baker *l. c.* 237.—Andes of Bolivia.

4. *T. pusilla* Gillies; Baker *l. c.* 237.—Mendoza.

5. *T. propinqua* C. Gay; Baker *l. c.* 237; Hieron. Fl. Cordob. t. 3, figs. 2–4.—Chili, Bolivia, and Argentine territory.

6. *T. rectangula* Baker *l. c.* 238.—Argentine territory.

Leaves 1–2 *in. long.*

7. *T. capillaris* R. & P.; Baker *l. c.* 238. — Peru, Bolivia, and Argentine territory.

8. *T. retorta* Griseb.; Baker *l. c.* 238.—Argentine territory.

9. *T. erecta* Gillies; Baker *l. c.* 239.—Argentine territory.

10. *T. Gilliesii* Baker *l. c.* 240.—Argentine territory.

11. *T. undulata* Baker *l. c.* 240. — Paraguay. Received lately from Dr. Glaziou as No. 13241.

Leaves 2–3 *in. or more long.*

12. *T. recurvata* Linn.; Baker *l. c.* 239.—Throughout Tropical America from Florida and Mexico to Buenos Ayres and Chili. I do not think *T. cordobensis* Hieron. Fl. Cordob. 10, t. 3, fig. 1, is more than a form of this species.

13. *T. cæspitosa* Leconte in Ann. Lyc. New York, 1826, ii. 129, which I know only from description, apparently belongs here. It is maintained as a distinct species in Chapman's 'Flora of the Southern United States,' p. 471. It grows in large clusters in the trunks of trees in Eastern Florida. The peduncle is 4–5 in. long, with adpressed small bract-leaves and 3–4 flowers in a dense spike, with violet petals. The semiterete lepidote leaves are reddish, and longer than the stem. Probably it is closely allied to *T. recurvata*.

14. *T. aulicola* Gillies; Baker *l. c.* 239.—Argentine territory.

15. *T. myosura* Griseb.; Baker *l. c.* 240.—Argentine region and Andes of Bolivia.

16. *T. fusca* Baker *l. c.* 240.—Obragilla.

Subgenus III. PHYTARHIZA (Visiani). — Leaves aggregated in a dense rosette, narrow, coriaceous, acuminate, persistently lepidote. Flowers arranged in simple or panicled distichous spikes. Stamens and pistil not longer than the calyx. Blade of petals suborbicular, spreading; claw without scales.

KEY.

Flowers yellow or whitish .	Sp. 17–19.
Flowers red or lilac.	
Spike simple . . .	Sp. 20–24.
Spikes panicled . .	Sp. 25–28.

17. T. CROCATA Baker. *Phytarhiza crocata* E. Morren in Belg. Hort. 1880, 27; 1881, 227; Regel. Gartenfl. 1881, 286. — Radical leaves linear-subulate, rigidly coriaceous, deeply channelled down the face, 6–9 in. long, $\frac{1}{6}$ in. broad low down, densely clothed on the back with deflexed whitish hair-like scales. Peduncle slender, $\frac{1}{2}$ ft. long, with a single adpressed lanceolate rigid bract-leaf, densely clothed with hair-like scales like those of the leaf. Flowers about 6 in a simple dense erect spike, erecto-patent; flower-bracts oblong-navicular, ovate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, densely lepidote. Calyx $\frac{1}{2}$ in. long; sepals acute. Petal-blade orbicular, patent, bright yellow, $\frac{1}{6}$ in. diam. Stamens and style not exserted from the calyx-tube.

Hab. South Brazil; small island at the mouth of the Rio Jaguaby, *Tweedie* 427! Introduced into cultivation by Lietze in 1880.

18. T. IXIOIDES Griseb. Symb. Fl. Argent. 1878, 333. — Tufts densely cæspitose, 5–6 in. long and broad. Leaves 20–30, ascending, lanceolate-acuminate, 3–6 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad low down, deeply channelled all down the face, very thick and rigid in texture, clothed all over the back with adpressed silvery scales. Peduncle 2–3 in. long; bract-leaves large, imbricated; upper oblong-navicular, whitish, chartaceous. Flowers 3–10 in a lax simple spike, with a flexuose rachis; flower-bract oblong, navicular, acute, whitish, finely lepidote, $\frac{1}{2}$–1 in. long; lower flowers with a distinct slender pedicel. Calyx $\frac{3}{4}$ in. long; sepals oblong, glabrous, striated in the firm centre. Petal-blade obovate-cuneate, bright yellow, $\frac{1}{4}$ in. long. Stamens and pistil not exserted from the calyx-tube.

Hab. Parana, *Christie*! Entre Rios, *Lorentz*! Conception del Uraguay, *Lorentz* 1190! Received alive from Mr. F. W. Burbidge in 1872.

19. T. XIPHIOIDES Ker in Bot. Reg. t. 105; R. & S. Syst. Veg. vii. 1200; Hook. in Bot. Mag. t. 5562. *Anoplophytum xiphioides* Beer Brom. 254. *Platyrhiza xiphioides* E. Morren in Belg. Hort. 1879, 370. *T. suaveolens* Lemaire Ann. Soc. Roy. Hort. Par. 1843, 179. *T. sericea* Hort. *T. odorata* Gillies inedit. — Leaf-tufts $\frac{1}{2}$ ft. long and broad. Leaves 12–20, rosulate or extending over a short stem, lanceolate-acuminate, 4–6 in. long, $\frac{1}{2}$ in. broad low down, channelled down the face, very thick and rigid in texture, clothed densely all over with adpressed lepidote scales. Peduncle 4–8 in. long; bract-leaves scariose down to its base, oblong, adpressed,

large, imbricated. Flowers about half a dozen in lax simple spike, very fragrant, with a straight glabrous rachis, very ascending; bracts oblong-lanceolate, acute, striated, glabrous, 2–2½ in. long; pedicel short. Calyx 1¾–2 in. long, glabrous; sepals lanceolate, acute. Petal-blade obovate-cuneate, cuspidate, pale yellow, above an inch long. Stigmas just protruded from the calyx.

Hab. Argentine region, *Gillies*! *Jameson*! Uraguay, *Tweedie*! *Gibert* 1129!

(To be continued.)

SHORT NOTES.

Lepidium latifolium in Sussex. — The occurrence of this fine plant at Appledean Common, about two miles from Chichester, seems worthy of record. Last summer (1886) it appeared in abundance where a new cut had been made for the Lavant, as it approaches the sea, and was very conspicuous on the newly turned-up soil. It had not previously been observed in the vicinity.—F. H. Arnold.

Carex paradoxa Willd. and Ornithogalum umbellatum Linn. in W. Suffolk. — I found this sedge, in May last, near Icklingham St. James, in a bog between the river and the road from Mildenhall. It seems to be new to the county. *Ornithogalum umbellatum* occurred in a sandy hedge about three-quarters of a mile to the N.W. of Mildenhall, far from houses, and apparently indigenous. Dr. Hind writes, "I consider *O. umbellatum* certainly native in Suffolk." I have seen it apparently so in Surrey also, and it has been known there as a wild plant, Mr. Beeby informs me, since the time of Gerard. The continental distribution is all in favour of its being truly a British plant. In the rebound from a readiness to include any garden stray as native, on next to no evidence, it seems likely that this and one or two other things have been somewhat rashly relegated to the class of "orchard" or "naturalised" waifs.—Edward S. Marshall.

Trichomanes radicans in Carnarvonshire.—In July last I found a very good specimen of *Trichomanes radicans* growing in a damp hole near the top of a range of mountains. Not knowing the locality in which this fern was discovered before, I cannot guarantee but that this one is identical with it, and for the same reason as that which induced the locality reported in 1865 to be kept secret, I must take the same precaution in this case. I may state, however, that it was not found on any part of Snowdon. I took a small portion of the fern and planted it, but I left the greater part of it behind.—J. Lloyd Williams.

REPORT OF DEPARTMENT OF BOTANY, BRITISH MUSEUM, FOR 1886.

By W. Carruthers, F.R.S.

During the past year 48,111 specimens have been mounted, named, and inserted in their places in the Herbarium. The phanerogamous plants have consisted chiefly of specimens collected in Central Europe by Schultz, in Greece by Heldreich and Orphanides, in India by Beddome, Schlagintweit and King, in Central Asia by Regel, in West Java by H. O. Forbes, in Australia by Baron von Mueller and the Rev. T. Lea, in South Africa by Robert Brown, Bolus, Woods and MacOwan, in Madagascar by Baron, and specimens received from Baillon, in Zanzibar by the Rev. W. E. Taylor, in Columbia by Moritz, in Mexico by Pringle, and in North America by Richardson, Curtiss, Suksdorf, Lemmon, Fawcett, and Howell. The specimens contained in the Herbarium of *Hepaticæ* purchased from the late Dr. Hampe have been all mounted and arranged. A considerable portion of the Wilson Herbarium of Mosses have been mounted and arranged, and the whole collection of Algæ which belonged to the late Prof. Dickie. The extensive series of Roses that belonged to Déséglise have been mounted and arranged in cabinets for ready reference.

The most important addition to the collections during the past year was the herbarium of the distinguished mycologist, C. E. Broome, which he bequeathed to the Trustees. It consists of a carefully-arranged collection of British and foreign Fungi, comprising about 40,000 specimens, all accurately named and localised, many of them being the types of species described by Mr. Broome. Accompanying the herbarium are the copy of Fries's 'Systema' which Mr. Broome employed as an index to his herbarium, the original correspondence connected with his collection, and a large series of mycological pamphlets amounting to 212 separate publications.

An interesting and valuable collection has been received, in return for a collection of British plants, from the Senatus of the New College, Edinburgh, consisting of the plants belonging to Archibald Menzies, who accompanied Vancouver round the world, and collected in Western America and the Pacific Islands. The collection consists chiefly of cellular cryptogams, grasses, and *Cyperaceæ*, and contains many plants of his own collecting, besides several collections acquired by him, especially the herbarium of Zier, who assisted Dickson in his 'Cryptogamic Plants of Britain' and Curtis in his 'Flora Londinensis.' By exchange also a small collection of plants from Madagascar, consisting of 55 species, was obtained from the Jardin des Plantes; and an interesting series of the fruits of Canada, formed by Prof. Maccoun.

Some valuable specimens necessary for the morphological series in the great hall have been presented by the Director of Kew Gardens.

The other additions to the collections by presentation during the year have consisted of 1421 species of plants from Australia, collected and presented by the Rev. T. S. Lea; 929 plants from the Rabai Hills and other districts in Eastern Tropical Africa,

collected and presented by the Rev. W. E. Taylor; 204 plants from Australia, from Baron von Mueller; 178 plants from the North Cape and other parts of Norway, collected and presented by H. N. Ridley, Esq.; 188 specimens of the genus *Ficus*, 26 species of *Pedicularis*, and 21 of *Primula*, from Dr. King; 209 species of plants, 14 cones and the stem of a square bamboo from Japan, from C. Maries, Esq.; 81 species of Ceylon plants from Dr. Trimen; 74 species of plants from India, from Dr. Walt; 186 species of Ferns from Perak, from the Rev. B. Scortechini; 40 plants from Borneo and an Irish orchid, from F. W. Burbidge, Esq.; 138 plants from Natal, from J. Medley Woods, Esq.; 156 plants from Manitoba, from R. Miller Christy, Esq.; 191 plants from Uruguay and a British *Silene*, from J. C. Mansel-Pleydell, Esq.; 36 plants from Greenland, from Prof. Warming; 14 species of rare American plants from Prof. Asa Gray; 6 species of *Eriogoneæ*, from Dr. C. C. Parry; 5 rare French plants, from J. Howse, Esq.; 85 species of plants from various regions, from A. T. Bennett, Esq.; 47 species of *Hepaticæ* from Natal, from W. H. Pearson, Esq.; specimens of *Ihipilia* from Mergui, from Dr. Anderson: 30 species of Fungi, from W. G. Smith, Esq.; 15 species of Fungi, from W. B. Grove, Esq.; British specimens of *Equisetum litorale* and two other British plants, from W. H. Beeby, Esq.; 2 *Carices* from Norfolk, from H. G. Glasspoole, Esq.; 4 British plants, from W. W. Reeves, Esq.; 4 British plants, from F. C. S. Roper, Esq.; 6 British plants, from the Rev. C. A. Newdigate; 4 plants from Wiltshire, from W. A. Clarke, Esq.; 158 plants from Donegal, from Miss A. Kinahan; and 27 British plants, from the Rev. W. R. Linton.

The following collections have been acquired by purchase:— 168 plants from the Balearic Islands, collected by Porta and Rigo; 200 plants of Central Europe, from Schultz; 362 plants of Greece, collected by Orphanides, and 87 by Heldreich; 100 plants from Italy, collected by Lojacano; 100 specimens of European *Hieracia*, from Peters; a collection of Erythræas, from Wittrock; 1347 plants from Himalaya and Tibet, collected by Schlagintweit; 485 plants of Syria, collected by Post; 911 species of plants, and 74 varieties of woods, from New Guinea, collected by H. O. Forbes; 379 Madagascar plants, collected by the Rev. Richard Baron; 200 plants of the Cape of Good Hope, from Prof. MacOwan; 179 critical plants of California, from E. L. Greene, Esq.; 424 specimens of plants from California, collected by Orcutt; 219 plants from Florida, collected by Curtiss; 424 plants from Mexico, collected by Pringle; 208 plants from Washington Territory, collected by Suksdorf; 204 plants from California, collected by Lemmon; 215 plants of New Mexico, collected by Palmer; 197 plants from South-east Oregon, collected by Howell; 100 species of *Juncus*, from Engelman; 450 species of Scandinavian Mosses, from Hartmann; 2051 species of Mosses and Hepatics, chiefly of species described by Dr. S. O. Lindberg; 697 species of Mosses, collected in South Africa by Dr. Rehmann; 23 species of Lichens from California, from Orcutt; 88 preparations of Lichens, from Joshua; 1100 species of Algæ from France, collected by Mougeot, Duprey,

Roumeguère; 150 species of Algæ from Scandinavia, from Witrock and Nordstedt; 445 Australasian Algæ, collected by the late Prof. Harvey; 125 species of *Diatomaceæ* of Europe, from Van Heurck; 50 species of Ascomycetous Fungi, from Rehm; 1100 species of European Fungi, from Sydow; and 300 European Fungi, from Rabenhorst.

At the close of the Colonial and Indian Exhibition several fine specimens of trees were presented to the Museum. A transverse section of a large Douglas pine, a similar section of a large fir, and a large plank of a spruce fir were presented by Frank Garrett, Esq.; a transverse section of the Karri tree, from M. C. Davies, Esq.; a very large specimen of *Kingia australis*, specimens of seven woods, and two spikes of a *Xanthorrhœa*, from the Hon. Malcolm Fraser, C.M.G.; and a very large and fine specimen of *Raoulia eximia*, from John D. Enys, Esq.

The most important additions to the collection of prints and drawings was the purchase of a collection of 1922 original drawings of British plants by the late Miss Onslow; a very extensive series of drawings of plants made by the late Prof. Schleiden; a collection of drawings of Orchids and other plants made in Borneo by F. W. Burbidge, Esq.; 42 original drawings of Orchids, by Miss Cooke; 493 original drawings of Indian plants; 5 drawings of Fungi, by the late Mrs. Russell, presented by Philip J. Worsley, Esq.; a drawing of *Spilocæa Pomi*, and proofs on India paper of the illustrations to Stevenson's Hymenomycetous Fungi, from W. G. Smith, Esq.; 355 engravings of plants; and proofs of the plant-figures from the 'Gardeners' Chronicle,' presented by Dr. Masters.

In the course of the year, at the request of my Lords Commissioners of the Admiralty, some investigations were made into the nature of the vegetation on ships' bottoms, and a report thereon was prepared for the Commissioners.

Mr. George Murray, an assistant in the Department, accompanied the Government Eclipse Expedition to Grenada as naturalist, for the purpose of investigating the life-history of the *Siphoneæ*. In addition to the observations made in Grenada, he brought back large collections for continuing his investigations, together with specimens of other cellular plants.

NOTICES OF BOOKS.

The Species of Ficus of the Indo-Malayan and Chinese Countries. Part I.—Palæomorphe and Urostigma. Illustrated. By George King, M.B., LLD., F.L.S., Superintendent of the Royal Botanic Garden, Calcutta. 'Annals of the Royal Botanic Garden, Calcutta,' vol. i. L. Reeve & Co.: 4to, pp. xiii. 66, tt. 91.

In this publication we have the first portion of the results of Dr. King's attempt to reduce the numerous Asiatic forms of *Ficus* to intelligible and comprehensible species. Whether he has succeeded to a reasonable extent can only be determined by the

practical use of his book. He certainly seems to have spared no pains in examining the types of the various species in European herbaria, and he has enjoyed, as he himself admits, the special advantage of working on living material. The summary of a communication by the same author to the Linnean Society, given in this Journal (p. 189), contains the outlines of his scheme of classification, which we will here discuss in a little more detail. It is hardly necessary to recall the fact that the sexual reproduction of figs has engaged the attention of various botanists, among whom Dr. King, during the last decade, with the result that we now know that the sexual organs present a considerable variety of modifications and combinations. Upon these modifications Dr. King bases his classification of the species. The sexual arrangements in the inflorescence of the fig is usually so misunderstood and misrepresented, even in some authoritative text-books of the most recent date, that it may not be out of place to explain briefly the ordinary conditions and the principal deviations therefrom. Functionally the individual flowers are invariably unisexual, and, with the exception of a small group, to which we shall again allude, the opposite sex is not represented in the same flower even by rudimentary organs. The perianth consists of two to six distinct or connate segments, or is very rarely altogether wanting. In a large proportion of the species of *Ficus*, including *F. Carica*, the perfect fertile female flowers are borne in separate receptacles,* and in many species on separate plants. The male flowers of such species appear in another set of receptacles; and invariably associated with them, and usually occupying all the space in the receptacle except a zone immediately within the bracts at the apex, are numerous barren female or "gall-flowers," which, in connection with certain insects, play an important part in the process of fertilisation of the ovules in the perfect female flowers. The singular relationships and mutual adaptations here encountered are amongst the most wonderful in the vegetable kingdom; but we have perhaps sufficiently explained them for our present purpose, namely, the comprehension of Dr. King's classification. The species are primarily divided into two numerically very unequal groups. The first, called *Palæomorphe*, because the author believes they exhibit the nearest remove from an originally hermaphrodite condition, consists of only ten species, characterised by having pseudo-hermaphrodite flowers. That is to say, the functionally monandrous male flowers also contain a gall-pistil; and separate gall-flowers occupy the same receptacles, while the perfect female flowers exclusively occupy other receptacles.† The gall and perfect female flowers

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* The cultivated fig of this country is the female of a dicecious species, of which the caprifig of the South of Europe is the male.

† We have not sufficiently examined Dr. King's work (or he is not explicit on the point) to be sure whether these two kinds of receptacle are found on the same or separate plants, though we suppose usually the former, because he describes one of the species of this group (*F. subulata*) as "truly dicecious." Unfortunately, as we think, he speaks of monœcious and dicecious receptacles, where it would have been more intelligible to employ terms unisexual and androgynous, restricting the former terms to their legitimate application.

are quite distinct in structure. The second group, in which there is not even a rudimentary pistil in the male flowers, is subdivided into six sections. In other words, there are seven sections altogether. As King observes, these sections are not all equally natural. The most natural of all perhaps is *Urostigma*, of which sixty-six species are here described and figured. This section is distinguished by having male, gall, and female flowers in the same receptacles, and includes such familiar species as *F. bengalensis*, *F. indica*, *F. Benjamina*, *F. religiosa*, and *F. infectoria*.

The remaining sections, which collectively comprise a large number of species, present two main distinctions. *Synœcia* has male and gall flowers in one set of receptacles, and fertile female and neuter flowers (having no trace of sexual organs) in another set of receptacles; while *Sycidium*, *Covellia*, *Eusyce*, and *Neomorphe* differ from *Synœcia* in having no neuter flowers, and from each other in the number of stamens in the male flowers and the position of the receptacles.

Descending to species, Dr. King finds his distinctive characters in the leaves and receptacles; the primary divisions in his clavis being founded on the relative length and thickness of the petioles, which is a better distinction than it looks on paper. The book is a large quarto and every species is figured natural size, and some striking varieties receive a second plate. Dissections are given of most species, four plates being specially devoted to the floral structure of the species of the section *Urostigma*.

The book was printed and published in Calcutta, and, with few exceptions, the drawings and lithographs were executed by native artists; and, although wanting the grace and beauty of drawings from living plants, there can be no two opinions respecting their usefulness. Indeed we may safely assert that most of the species are determinable from the figures and text. Though some botanists may differ from Dr. King in questions of detail, and concerning the limits of some of the species, we are confident that all will agree that this is a most valuable contribution to systematic botany, and will look forward with great interest to its early completion. The copious material Dr. King has had under examination has led to the reduction of a large number of proposed species, many of them founded on very imperfect specimens; but, on the other hand, he also publishes a considerable number of distinct novelties. Though the printing was done by natives of India, it is singularly free from blemishes. We notice, however, that the author invariably writes "pedicillate," but such a word as "referrible" could hardly have been intentional.

W. B. H.

The Fungus-Hunter's Guide. By W. De Lisle Hay, F.R.G.S. London: Swan Sonnenschein & Co.

This little volume is designed as a field pocket-book for amateur mycologists, to aid on the spot in the identification of the larger fungi. It is a supplement to Mr. De Lisle Hay's larger work, mentioned in these pages a month or two ago. It is founded on Dr.

Cooke's 'Handbook,' and contains reprints of the illustrations of the larger fungi as contained in that work. Mr. Hay's new volume is a kind of key to Cooke's 'Handbook,' with notes added as to the presumed edibility of certain species, with which notes on edibility Dr. Cooke would disagree *in toto*. Opinions will differ as to the utility of this work as a field-book; personally we doubt whether it is possible for any beginner to determine fungi with certainty in the field. Each individual species requires close and careful study in all stages of growth, and fungi must be examined many times and under many conditions of growth and habit before they are well known to beginners. To persons who have long studied fungi *a mere list* of names is very handy in the field; a list is useful in recalling names to an overcharged memory. In our opinion, one of the worst signs of the times is the great desire for securing names, and publishing district lists of names. In "fungus-forays" the unfortunate "guides" are so terribly plagued for *names* by amateurs that the former are almost driven mad. Besides, there is no real utility in supplying names to amateurs, for the names are forgotten as soon as heard, and the same species of fungus is presented to the "guide" for a name a hundred or more times during one afternoon. The mere knowing of the names of plants does not make a botanist. It would be much better for an "amateur" to well master the characters of, say, a dozen species, and so make a good foundation for a satisfactory advance. Mr. Hay's new venture, as an abbreviated form of one part of Dr. Cooke's 'Handbook,' may possibly help a few amateurs a little in a difficult study. We regret to see that the source whence the letterpress and illustrations have been derived is not mentioned. The appropriation by wholesale of another person's work without acknowledgment is apt in some cases to cause ill-feeling and provoke resentment. The originals of the illustrations of Mr. Hay's book are in the British Museum, and if he will only avail himself of the never-failing courtesy of the keepers of the National Herbarium at South Kensington, he will be able to supply the names for his at present nameless illustrations. A large number of Mr. Hay's so-called edible species are not proper objects of food for even barbarians or savages. The new popular names are a droll satire on popular terminology. W. G. S.

It is a real satisfaction to feel that the first volume of Dr. Braithwaite's Moss-Flora is at length complete; and although the part appears nearly two years after the ninth, it will, we think, amply repay the patience of subscribers. After all, it is better that a work of this kind should be done well than done quickly. The present part, besides concluding the *Tortulaceæ* and describing the one British species of Ehrhart's *Weberaceæ*, contains a good deal of additional matter—a supplement of eleven omitted species or varieties, a list of addenda to the localities of rarer species, an alphabetical index, and a classified list of the species contained in vol. i. May we not hope that Dr. Braithwaite will extend this list so as to form a complete catalogue of British Mosses, which would

at the same time be a precursus to the remaining volumes of the Moss-Flora? We are sadly in want of a new Catalogue, the 'London Catalogue' of 1881 being both out of print and out of date. Lastly, the *Fissidentaceæ* have been revised in eight pages to be added to Part IV., which was published before Mr. Mitten's paper on this family appeared in the Journ. Linn. Soc. Eight plates are issued with this part, of the usual exquisite design and workmanship. The volume now completed comprises in 315 pages of letterpress and 45 plates the first half of the Acrocarpous Mosses, viz., *Andreæaceæ*, *Buxbaumiaceæ*, *Georgiaceæ*, *Polytrichaceæ*, *Fissidentaceæ*, *Leucobryaceæ*, *Dicranaceæ*, *Tortulaceæ*, and *Weberaceæ*. That it is well up to date is shown by the description, in the supplement, of *Dicranum undulatum* Ehrh., a species unknown to Britain until the 30th of last May.

New Books.—R. Wolf, 'Krankheiten der landwirtschaftlichen Nutzpflanzen durch Schmarotzerpilze' (Berlin, Parey: 8vo, pp. viii. 150, 50 cuts.).—L. Carlier, 'La Flore des Amateurs' (Paris, Carvé: pts. 1–3, 8vo, pp. 182, 247, 221).—F. M. Bailey & P. R. Gordon, 'Plants reputed poisonous and injurious to Stock' (Brisbane, Beal: 8vo, pp. 112, tt. 44).—G. Bonnier & G. de Layens, 'Nouvelle Flore pour la détermination facile des plantes sans mots techniques' (Paris, Savy: 8vo, pp. xxxiv. 271).—J. G. Raya, 'Cultivo del Tabaco' (Madrid, Alonso: 8vo, pp. 180).—J. Honba, 'Les Chênes de l'Amerique' (Hasselt, Ceysens: 8vo, pp. 329. viii).—W. C. Hazlitt, 'Gleanings in Old Garden Literature' (London, Stock: 8vo, pp. 263).—L. Lerone, 'Essai d'un groupement des Familles végétales' (Paris, Savy: 8vo, pp. 100: 3 fr.).

Articles in Journals.

Bot. Zeitung (May 27, June 3, 10, 17).—E. Zacharias, 'Beiträge zur Kenntniss des Zellkerns und der Sexualzellen.'

Bot. Centralblatt (Nos. 25, 26, 27).—S. Gheorghieff, 'Beitrag zur vergleichenden Anatomie der Chenopodiaceen.'

Bull. Torrey Bot. Club (June).—E. A. Schultze, 'Descriptive List of Staten Island Diatoms' (1 plate).—N. L. Britton, 'Flowers of *Populus heterophylla*.'—E. L. Greene, 'Californian Ranunculi' (*R. maximus* sp. n.).—B. D. Halsted, 'Dioecism in *Anemone acutiloba*.'—E. E. Sterns, 'Anomalous Forms of *Saxifraga virginiensis*.'

Gardeners' Chronicle (June 4).—*Aristea platycaulis* Baker, *Agave Henriquesii* Baker, spp. nn.: *Iris lupina* Foster, *I. Biliotii* Foster, spp. nn.—(June 11). *Coelogyne Sanderiana* Rchb. f., *Vanda Amesiana* Rchb. f., spp. nn.: *Zygocolax** *Veitchii* Rolfe; *Polemonium cæruleum* var. *himalayanum* Baker.—W. B. Hemsley, 'The Botanical Magazine' (cont.).—*Yucca brevifolia* (fig. 145).—(June 18). *Coelogyne*

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* "A bigeneric hybrid between *Colax jugosus* (male) and *Zygopetalum crinitum* (female)."

Foerstermanni Rchb. f., *Oncidium lucescens* Rchb. f., *Asphodelus comosus* Baker, spp. nn.

Journal de Botanique (June 15).—E. Wasserzug, 'Sur quelques Champignons pathogènes.' — A. Franchet, 'Plantes du voyage au Golfe de Tadjourah' *Loranthus Fauroti*, *L. nummulariæfolius*, *Euphorbia Fauroti*, spp. nn.). — G. Colomb, 'Sur la vrille des Cucurbitacées.' — G. Le Monnier, 'Sur la valeur morphologique de l'albumen chez les Angiospermes.'

Œsterr. Bot. Zeitschrift (June). — B. Blocki, *Galium polonicum* n. sp. — A. Tomaschek, 'Ueber Symbiose von Bacterien (in Zoogloea-Form) mit der Alge *Glococapsa polydermatica*.'—L. Celakovsky, '*Utricularia brevicornis*.' — V. v. Borbás, '*Quercus Csatoi*.' — G. Schneider, 'Hieracien des Riesengebirges.'—E. Formánek, 'Rubus-Formen.'—J. B. Keller, 'Flächendrüsigkeit.'

LINNEAN SOCIETY OF LONDON.

May 5th, 1887.—William Carruthers, F.R.S., President, in the chair.—Mr. Ernest W. Forrest and Mr. George Perrin were elected Fellows; Mr. W. Hadden Beeby, Mr. Adolphus H. Kent, and Mr. J. Medley Wood (Natal), were elected Associates; Dr. Geo. Aug. Schweinfurth (Professor of Botany, Cairo), Count Hermann Solms-Laubach (Professor of Botany, Gottingen), Dr. Franz Steindachner (Conservator Roy. Mus. Vienna), M. le Dr. Melchior Treub (Director Jard. Bot. Buitenzorg, Java), and Dr. Augustus Weismann (Professor of Zoology, Univ. Freiburg), were elected Foreign Members of the Society.—Photographs were exhibited and a letter read from Mr. J. G. Otto Tepper, F.L.S., regarding a gall-formation on *Scævola spinescens*, observed by him at Yorke's Peninsula, South Australia. The galls affect the plant in various ways, influencing the hairs of the flower buds, &c.—On behalf of Mr. W. Brockbank, F.L.S., Mr. J. G. Baker exhibited photographs of a series of forms of *Narcissus reflexus* of Brotero, from Ancona, North Portugal, and grown in Mr. Brockbank's garden at Didsbury. *N. reflexus* is ranked as a species by Nyman, but the variation in the Portuguese plant is so great in the size and shape of the corona that it is evident no definite line of demarcation can be drawn between the Spanish *N. triandrus* and the Brittany *N. calathinus*. From this it may be inferred that all the varietal forms of the section Ganymedes constitute but a single species.—Mr. J. Harris Stone exhibited the flowers of *Nicotiana glauca* from Fuerteventura, one of the easterly islands of the Canary group. The plant is a native of Buenos Ayres, where it grows to a height of ten feet. In the islands of Fuerteventura and Sanzarote he found the plant growing wild abundantly on the path sides, and even in the streets of the towns. From special inquiries Mr. Stone learned that this species of tobacco plant had been in an unknown manner introduced into the Canaries about 1867–69, since which date it had spread to an extraordinary degree unheeded by the inhabitants.

The plant is known among them as "mismo" (same), an appellation referring to its spreading everywhere similarly on the islands in question. It there grows to a height of three or four feet.—Some fresh Primulas from the neighbourhood of Saffron Walden were exhibited by Mr. Frederick J. Hanbury, including two interesting hybrids, viz., *Primula elatior* × *vulgaris* and *P. elatior* × *veris*. The latter is exceedingly rare, and has only been known as British during the last four years. Both hybrids are intermediate in their character between their parents, and neither of them produce any fruit in cultivation, but wither away immediately after flowering.—A paper was read, "On Experimental Observations on certain Heterœcious Uredines," by Chas. B. Plowright. Among these *Puccinia phalaridis*, n. sp., *P. arenariicola*, n. sp., *Gymnosporangium clavariæforme*, *G. juniperinum*, and *G. sabinæ* more particularly occupied the author's attention, full details of the cultures and analyses of the experiments being given.—There followed a paper "On *Vaccinium intermedium* Ruthe as a new British plant," by Mr. N. E. Brown, A.L.S. Prof. Bonney, F.R.S., discovered this plant in August, 1886, at Cannock Chase, where it is plentiful in certain spots; *V. Myrtillus* and *V. Vitis-idæa* being also abundant. It is regarded as a hybrid between these two species, originating independently at Cannock Chase, and not to have been introduced from the Continent.—A paper was read by Mr. R. A. Rolfe on "Bigeneric Orchid Hybrids," the subject being treated chiefly with reference to its bearing upon classification. After pointing out that these hybrids, as in the case of those between species of the same genus, were more or less intermediate between the two parents, the practice was recommended of compounding a name from that of the two parent genera, so as to avoid all confusion with existing genera. With regard to orchid hybrids generally the following are the author's conclusions:—(1), hybridisation may take place, not only between distinct species, but also between distinct genera, or between plants so structurally different as to be usually regarded as such; (2), these hybrids are generally of artificial origin, or accidentally produced, and cannot be treated in the scheme of classification, either as varieties, species, or genera; (3), the possibility of hybridisation taking place between species hitherto considered as distinct does not necessarily prove them to be merely forms of the same species; (4), the occurrence of a hybrid between two structurally different genera does not prove the necessity of uniting them in one, nor can such hybrids be arbitrarily referred to either of the parent genera; (5), species and genera will always have to be dealt with in the scheme of classification according to their structural peculiarities and differences, without reference to the possibility of hybridisation taking place between them.

We find that by an oversight we have omitted to record the appointment of Mr. Edmund Gilbert Baker to an assistantship in the Department of Botany, British Museum.

ON THE HISTORY OF BOTANY IN JAPAN.

By Tokutaro Ito, F.L.S.

(With a Portrait.)

My object in writing the following pages is not to give a detailed history of botanical studies in Japan, but simply to make a few remarks upon the interesting paper by Mr. F. V. Dickins, F.L.S., on the "Progress of Botany in Japan," published in this Journal for May last. More detailed accounts of the subject, however, were written by my grandfather, Ito Keisuke, nine years ago, and presented to the Imperial Academy (Gakushi Kwai-In) of Tōkiō, of which he deservedly has the honour to be one of the original members. This memoir has been published in the first volume of the 'Transactions of the Academy' (Parts 3 and 4), and to this, in 1883, he wrote a Supplement (Trans. Imp. Acad. Tōkiō, 1883, pp. 61–69).

Leaving out ancient herbals, such as the 'Wamiō Shō' of Gen-Jun, the 'Honzō' of Kō-Rai, and others, we may establish the first epoch of botanical studies in Japan at the time of Kaibara Tokushin (1630–1714). This illustrious man, evidently the Aristotle of Japan, is widely known among Japanese authors not only as the first botanist who published the 'Yamato Honzō' or the Natural History of Japan, but more especially as a *savant* of infinite knowledge and moral thought. He is always admired as a man of simple and modest character, and extremely kind and generous nature. Besides the 'Yamato Honzō,' which consists of nineteen *livraisons*, his notable works on botany are the 'Wamiō Honzō' (Japanese Nomenclature of Botany), the 'Kwa-fu' (Collection of Flowering Plants), and the 'Sai-fu.' He died in the fourth year of Shōtoku (1714), in the eighty-fifth year of his age.

The 'Yamato Honzō' of Kaibara has been written, we might say, without any particular classification. But after that time the influence of the well-known Chinese work, 'Pun-tsaou-kang-mûh' or Systema Naturæ, by Le-She-Chin, became prevalent among Japanese authors, the principal exponents of which may be mentioned—Tō Jakusui (about 1690–1710), of Yedo, the illustrious author of the great Japanese Encyclopædia, 'Shobutsu Ruisan,' which consists of one thousand volumes, or, more properly, *livraisons;* Matsuoka Gentatsu, of Kiōto, better known by the name of Igansai, was famous during the years of Shōtoku and Kiōhō (1711–1735); Gotō Kōsei, of Yedo, noted during the years of Yenkiō and Hōreki (1745–1760), whose death took place in April of the eighth year of Meiwa (1771), in the seventy-fifth year of his age; Tamura Gen-iu (about 1750–1770), of Yedo; Hiraga Gennai, of the province of Sanuki, who came to Yedo, and studied under Tamura Gen-iu; and lastly, Abé Shōwō.

We come now to the time of one of the great men of Natural History in Japan, who is called by Siebold the "Linné du Japon": I mean Ono Ranzan. He studied Natural History in the school of

Matsuoka Gentatsu. His classical work, 'Honzō Kōmoku Keimō,' or Explicatio Systematis Naturalis, though following, as his predecessors, the scheme of 'Pun-tsaou-kang-mûh,' is a remarkable illustration of his infinite knowledge and accuracy, written throughout in his fluent style, which naturally deserved a position as a model for works of the kind. But it is regretted that this useful book has been hardly noticed by European authors, even by those who have paid more or less attention to less notable works, possibly on account of the absence of illustrations of the plants or animals, which he generally describes with wonderful accuracy. But Ono Ranzan was not a man who neglected illustrations; his ability as a botanical draughtsman is shown by the figures of the 'Kwa-wi'—the figures relating to trees having been produced with his skilful brush. In 1799, at the advanced age of seventy-one, he accepted the summons of the Shōgunate Government, and came to Yedo (the present Tōkiō), having been appointed as a Professor of Natural History, and at the same time occupied a prominent position on the Medical Staff of the Government. Yedo at once became a Paris for the attraction of naturalists in Japan, and a nucleus for the concentration of botanical and zoological studies. While bearing the sceptre of natural studies and holding the offices from time to time conferred upon him, he made frequent tours in different parts of the Empire for the collection of natural objects, and examined them with minute and careful observations. The result of his vast collection appeared ultimately in 1802, under the title, now well-known, of 'Honzō Kōmoku Keimō.' Besides this work, he published 'Sōmoku Jippinkō,' and other volumes. His death took place in January, 1810, at the remarkable age of eighty-two. A grandson of Ono Ranzan, Mr. Ono Motoyoshi, is an able botanist, frequently referred to by Franchet and Savatier in their 'Enumeratio.' The author, Shimada Yōnan, of the 'Kwa-wi,' or a Collection of Flowering Plants, has been honoured by a French translation by Dr. Savatier, which appeared, but without figures, in Paris in 1873. At this time many botanists of more or less eminence arose, among whom Ohta Shōgen, Okamura Shōken, Shidara Shiyō (of Yedo), and Sō Shōkei (of Dewa) are highly spoken of.

The next in order was a man of prominent character, not only for his minute observations and practical knowledge, but also as the author of so extensive a work as 'Honzō Dsufu.' Iwasaki Tsunemasa, of Yedo, was a superintendent of a botanic garden belonging to Shōgun, and also the author of 'Sōmoku Ikushu,' published in two volumes about 1817. There is also a manuscript work of ten *livraisons*, bearing the title of 'Honzō Dsusetsu,' which my grandfather in his own manuscripts explains as follows:—"Although this work bears the title of 'Dsusetsu,' or Illustrations and Descriptions, it exclusively consists of figures, and has no description at all. This work was executed by my lamented friend Iwasaki during the years of Bunkwa (1804–1817), in order to supply the want of accurate figures, which are more or less neglected in most important works of his predecessors, more

particularly in Ono Ranzan's 'Honzō Kōmoku Keimō.' It was after the accomplishment of this work ('Honzō Dsusetsu') that Iwasaki began to prepare his 'Honzō Dsufu.'" As our author greatly regretted the want of accurate figures in the works of his predecessors, he finally resolved to devote himself to this great task, and began to draw every plant which came under his notice with untiring industry, the result of which is the admirable 'Honzō Dsufu.'

As a painstaking and original observer of plants, perhaps few naturalists in Japan have surpassed the patience of Midsutani Sukeroku. Being one of the disciples of Ono Ranzan, he penetrated into deep forests, surveyed for botanical purposes many mountains, such as Kiso, Kumano, and Ibuki, and discovered numerous plants which are entirely new to science; the genus *Sugerokia*, which was established to his honour by Miquel (now emerged into *Helionopsis*), will keep his memory green. He published, in 1809, the useful 'Buppin Shikimei,' or a Nomenclature of Natural History, in two volumes, which in 1825 he supplemented by two additional ones. Another botanist of Owari, Toneri Buhiō, published in 1823 a work entitled 'Sōmoku Seifu,' or the Habits of Plants, which consists of three *livraisons;* and again in 1827, with the co-operation of many botanical friends, he has edited the 'Iudoku Sōmoku Dsusetsu' (Illustrations and Descriptions of Poisonous Plants), which appeared in two *livraisons*.

Until this time botanical studies in the far East followed nothing but the unscientific method founded on the Chinese work, 'Pen-tsaou-kang-mûh.' The merit of first bringing before Japanese botanists the minute anatomical structures of plants is due to Udagawa Yōan, who published in Yedo a volume under the title of 'Shokugaku Keigen,' or an Introduction to Botany. In the preface to this work he states that his aim in publishing this work is simply to introduce the knowledge of the internal and minute structures of plants; all other subjects he leaves mainly to 'Taisei Honzō Meiso,' which appeared some years before.

One of the most successful botanists who has appeared in Japan since the time of Ono Ranzan is doubtless Iinuma Yokusai. The most extensive publication of plants which had appeared up to this date was the 'Honzō Kōmoku Keimō' of the former author, written with patient labour and genius; but the ground upon which the arrangement of plants is founded follows simply the vague and unphilosophical method of 'Pun-tsaou.' Iinuma Yokusai, a physician of Ohgaki, a town in the province of Mino, was a man who, frankly accepting the view propounded by my grandfather, accomplished a great task entirely founded upon a scientific basis. Being a pupil of Midsutani Sukeroku and a contemporary of my grandfather, Ito Keisuke, he obtained a great knowledge of plants from his teacher, Midsutani. He brought out in 1856 his *magnum opus*, 'Sōmoku Dsusetsu,' or Illustrations and Descriptions of Plants, which, consisting of twenty volumes or *livraisons*, arranged according to the system of Linnæus, is a splendid monument in the history of Botany in Japan. Unfortunately in these volumes the

author treats simply those plants which are generally known as herbs, but he entirely neglects trees or more properly those plants which have ligneous stems, both the figures and descriptions of which are said to remain still in manuscript. A second edition has been issued by Mr. Tanaka Yoshiwo, who, having studied Botany under my grandfather, is known as one of the prominent botanists of Japan of the present day.

Before bringing my brief remarks on the history of botanical studies of Japan to an end, in order to serve as a short response to the inquiries of many botanists frequently addressed to us, perhaps it may not be altogether useless to say a few words upon some of the principal publications of my grandfather, from the time of the appearance of his 'Taisei Honzō Meiso' in 1828 up to the present day. Besides 'Nihon Shokubutsu Dsusetsu,' he is carrying out his 'Nihon Sambutsushi,' or the Natural Products of Japan, in which, although the three kingdoms of Natural History are embodied, that of the Vegetable is treated with special attention, containing descriptions of many new and rare plants, as well as illustrations of those which are not found in other books. This work consists of the flora, fauna, &c., of all the provinces of Japan, each treated in separate volumes, of which those of Yamashiro, Ohmi, Musashi, Mino, and Shinano, have already appeared in eleven volumes or *livraisons* during the interval between 1873 and 1877, and are still in the course of publication. He proposed, moreover, to supply the defect of Iinuma's work observed above, *i. e.*, the want of figures and descriptions of trees, with the same title of 'Sōmoku Dsusetsu,' but he prefixed the words "Koishikawa Shokubutsuyen," or Koishikawa Botanic Gardens, in which place, under his own direction, he had an ample supply of plants which he wished to determine. The first two volumes, arranged according to the modern classification of Bentham and Hooker, were published respectively in 1881 and 1883 in folio, the descriptions of a single plant occupying one leaf, each accompanied by a coloured plate; a few parts of the third volume have lately appeared. His latest work, which will be also continued, is a memoir on the history of plants whose flowers are admired by man, bearing the title of 'Kwashi Zakki' (Flora Historica), and published among the 'Transactions of the Imperial Academy of Tōkiō.' This memoir may perhaps be of interest to more advanced students of Botany, because, besides dealing with morphological characters of plants as well as their economic properties, he mainly devoted his attention to various historical records. For the sake of clearness, I may take an instance to illustrate the intention which he especially devoted his labours to represent. Tea (*Camellia Thea*) is a plant whose natural abodes are frequently disputed by various authors. Thus Alph. DeCandolle, in his 'Origine des Plantes Cultivées,' hesitating about the assertion of its spontaneous growth in Japan, says:—"Thunberg believed the species to be wild in Japan, but Franchet and Savatier absolutely deny this. Fortune, who has so carefully examined the cultivation of tea in China, does not speak of the wild plant. . . . . It is probable that it exists in the mountainous

districts of South-eastern China, where naturalists have not yet penetrated." My grandfather found them growing wild abundantly in several mountainous districts of the Island of Kiusiu, as well as in many warmer places of the principal Island of Japan, for instance, in Kumano, in the province of Kii, but he says that they are not found in the northern parts.

REMARKS ON THE NOMENCLATURE OF THE EIGHTH EDITION OF THE 'LONDON CATALOGUE.'

By B. Daydon Jackson, Sec. L.S.

(Continued from p. 181.)

407. *Prunus spinosa* L. Sp. Pl. ed. 1, 475. — The variety which produces its flowers and leaves together is usually quoted as var. *coëtanea*, "Wimm. et Grab. Fl. Siles. ed. 2, i. 10" (1844?); *P. fruticans* Weihe in Flora (1826), 748, but on the next page Weihe alludes to this in the following words:—"Es giebt zwar von *Prunus spinosa* auch eine Varietas serotina, die sich mit den Blumen bis zum Ausbruch der Blätter verspätet. Aber diese Varietät scheint mir etwas krankhaftes zu haben; denn die Blumen derselben sind grünlich, haben stamina inclusa und bringen keine Früchte." I have quoted the author's own words to show that he used the terms "varietas serotina" and "stamina inclusa" in a technical sense only, not meaning to bestow a varietal name *serotina*. Regarding this number and the next, Mr. Druce writes, "In the 'Student's Flora,' where *P. spinosa* L. and *P. insititia* L. are considered to be subspecies, they are correctly quoted as such of *P. communis* Huds. ed. 2, 212, but in the 'London Catalogue,' where they are given specific rank, *P. spinosa* L. Sp. Pl. [as above] should be given in preference to *communis* Huds."

487. *Potentilla maculata*. — Numerous correspondents have pointed out the misprint of Power for *Pourr.* Hartmann, Handb. Skand. Fl. ed. 11 389, (1879), cites *P. verna* L. Fl. Suec. ed. 2, thus neglecting the publication of the *verna* in Sp. Pl. ed. 1, 498 (1753), probably from the synonymy showing some confusion between the true plant and *P. opaca* and *P. aurea*. To retain an old name in a varied sense is always risky; it is therefore hardly advisable to adopt Hartmann's name. I give the principal synonyms of No. 487 in order, by which we shall see that the two contemporaneous names of Haenke and Pourret are superseded:—*P. rubens* Vill. Prosp. Fl. Dauph. 46 (1779); et in Fl. Dauph. iii. 566 (1789). *P. salisburgensis* Haenke in Jacq. Coll. ii. 68 (1788). *P. maculata* Pourret in Mém. Acad. Toulouse, iii. (1788), 326. *P. alpestris* Hall. f. in Mus. Helv. i. (1823), 53. *P. villosa* Dalla Torre, Alpenfl. 91 (1882). *Fragaria* . . . . . Crantz. Stirp. Austr. ii. 15 (1763), tab. 1, fig. 2. *F. rubens* Crantz. *op. cit.* ed. 2, ii. 75 (1769), with the same plate as in former issue. The Scandinavian botanists regard our *verna* as *P. minor* Gilib. Exer. Bot. 362 (1792).

488. *P. Tormentilla* Neck. in Act. Acad. Theod. Palat. ii. (1770), 491, is earlier than Scopoli, Fl. Carn. ed. 2, i. 360, where we find *P. Tormentilla-erecta;* but *P. silvestris* Neck. Delic. Gallo-Belg. i. 222 (1768), is earlier still.

491. *P. Anserina* is spelled with a capital to its specific name, *Anserina*, with *Fragariastrum* and *Tormentilla* in this genus, being generically employed in pre-Linnean times.

495. Mr. Druce points out that *P. palustris* Scop. Fl. Carn. ed. 2, i. 359 (1772) must supersede *P. Comarum* Nestl. Monogr. 36 (1816).

497. *Alchemilla arvensis* Scop. Fl. Carn. ed. 2, i. 115 (1772), is earlier than Lam. Fl. Fr. iii. 304 (1778), who indeed refers to Scopoli.

498. *A. vulgaris*, b. *montana*. *A. montana* Willd. Enum. 170 (1809) is founded on *A. vulgaris* γ *hybrida* Willd. Sp. Pl. i. 698 (1797), and that appears to be the earliest varietal name. Willdenow in a note points out that the plant is a variety of *vulgaris*, and not of *alpina*, as previously reckoned; Hudson makes a species of it, *A. minor*, in Fl. Angl. ed. 1, 59.

500. *A. conjuncta* Bab. in Ann. & Mag. Nat. Hist. x. (1842), 25, is preceded by *A. argentea* Don ex Trevelyan, Veg. Faroe Islands (Florence, 1837), 10. Babington in describing the plant refrained from adopting Don's name, fearing confusion with Lamarck's *A. argentea* Fl. Fr. iii. 303, which is nothing but *A. alpina* L.

504. *Poterium polygamum* Waldst. et Kit. Pl. Rar. Hung. ii. 117, t. 198 (1805), is, as Mr. Druce observes, an earlier name for the plant commonly known as *P. muricatum* Spach in Ann. Sci. Nat. Sér. 3, v. (1846), 36; Spach cites the plate of Waldstein and Kitaibel, and in a note says, "Nomen omnino inaptum"; criticising the description, and referring the plant figured to his variety α *platylophum*.

518. *Rosa pomifera* Herrm. Diss. 16. — In 'London Catalogue' misspelled Herm., as pointed out by Mr. Druce.

535. The genus *Cotoneaster* was founded by Medicus in his 'Geschichte der Botanik,' p. 85 (1793), the single plant on which he established it being *Mespilus Cotoneaster* of Linnæus, to which he gave the name *integerrimus*. When Lindley, in 1820, brought forward the genus of Medicus, he totally omitted to give any reference to its founder, and under his first number, *vulgaris*, ranged *Mespilus Cotoneaster* "Willd." as a synonym. Lindley's action is wholly indefensible, as Medicus was free to choose any specific name when using the old specific name for generic.

574. *Rosa canina* var. *coriifolia* Baker.—Objection has been taken to this since Grenier has referred Fries's plant to Besser's *R. solstitialis;* but Mr. Baker has pointed out to me that Déséglise, in Bull. Soc. Bot. Belg. xv. (1876), 379, when treating of *R. coriifolia* Fr. Nov. ed. 1, 33 (1814), quotes *R. solstitialis* Gren. Fl. Jurass. 237 (1865), non Besser, Prim. Fl. Galic. i. 324 (1809); the latter he refers doubtfully to *R. dumetorum* Thuill. Fl. Par. ed. 2, 250 (1799), Grenier's and Besser's homonyms belonging to different sections of the genus.

581. *Callitriche verna* Linn. Fl. Suec. ed. 2, 2 (1755); Kuetzing in Reichb. Pl. Crit. t. 881 (1831), et in Linnæa, vii. (1832), 175.

C. vernalis Koch, Syn. ed. 1, 245 (1837). — These citations are sufficient to show that Koch, not Kuetzing, changed *verna* into *vernalis*, notwithstanding other assertions to the contrary.

562. *Sedum roseum* Scop. Fl. Carn. ed. 2, 326 (1772), precedes *S. Rhodiola* DC. Pl. Graisses, t. 143, et Fl. Franç. iv. 386 (1805). Two copies of the former work to which I referred are imperfect, but the copy in the King's Library, British Museum, has the plate cited.

563. *S. Telephium* L., var. *purpurascens* (Koch).—Is not this the same as the var. *β. purpureum* L. Sp. Pl. ed. 1, 431 ? The question is propounded by Mr. Druce.

571. *S. rupestre* L. Sp. Pl. ed. 1, 431 (1753); Huds. Fl. Angl. 170 (1762); ed. 2, 194 (1778). — Mr. Druce writes, "I have previously urged the claims of Linnæus, Sp. Pl. (non herb.)." Hudson cites the diagnosis of Linnæus, but adds Ray's name as a synonym.

601. *Epilobium alsinefolium* Vill. Prosp. 45 (1779); Fl. Dauph. iii. 511 (1789). *E. oriyanifolia* Lam. Encyc. ii. 376 (1786). — Mr. Druce states that continental writers use Lamarck's name, from their overlooking Villars' first publication, and only taking up the name *alsinefolium* from his 'Flore de Dauphiné.'

609. *Bryonia dioica* Jacq. Fl. Austr. ii. 59 t. 199 (1774), not of Linnæus, who has no such name.

623. *Trinia vulgaris* DC. Prod. iv. 103 (1830).—This consists of *T. Henningii* Hoffm. Umb. 94 (1814), with *T. glaberrima* var. Hoffm., and other forms added. Linnæus knew nothing of Hoffmann's genus.

639. *Pimpinella major* var. *dissecta* "Wallr."—Referring to this, a correspondent writes, "As there appears to be considerable doubts as to the *dissecta* of Retz. belonging to *P. major*, see Nyman [Consp. 306]; and as Wallroth does not appear to have called a variety *dissecta*, would not this be more correctly named var. *laciniata* Wallr. ? See Sched. Crit. de Plant. Flor. Halens. p. 123 (1822). If *dissecta* be preferred, Koch appears to be the authority." There is an initial difficulty in this, as Wallroth, Koch, and others use the specific name *magna;* but, neglecting this for the moment, we find the following:—*P. major* Huds. *P. magna* L. Mant. ii. 219 (1771); Wallroth, Sched. 122 (1882). *P. magna, β. rubra, γ. laciniata, δ. dissecta;* all of Wallroth, *l. c.* p. 123. The first is a reduction of *P. rubra* Hoppe in Cent. Exsicc. *Saxifraga major umbella rubente*, Bauh. Pin. 159. The second, "foliolis [*sic*] omnibus laciniatis, foliolis decussive-pinnatis, laciniis oblongis dentatis patentibus.—*P. alia in lacinias dioica*, Clus. Hist. i. 50." The third, "foliis bipinnatifidis, foliolis lineari-lanceolatis elongatis.—Morls. Hist. F. V. 9, f. 3." Koch, Syn. ed. 1, 287; ed. 2, 316, does not give full citations, hence a misapprehension on the part of the correspondent mentioned.

640. *Fœniculum officinale* Allioni, Fl. Pedem. ii. 25 (1785).—An earlier name is *F. capillaceum* Gilib. Fl. Lituan. ii. 40 (1782); et Exer. Bot. i. 220 (1792).

641. *Myrrhis Odorata* Scop. Fl. Carn. ed. 2, i. 107 (1772).—The specific name is spelled with a capital letter, having been used generically by Rivinus.

The genus *Coriandrum*, 168, should follow *Tordylium*, 181.

711. *Valeriana officinalis* L. — Both varieties should apparently be ascribed to Syme (1865). If the form termed *sambucifolia* be regarded as an independent species, the following statement is submitted:—*V. excelsa* Poir. Encyc. viii. 301 (1808). *V. sambucifolia* Mikan ex Pohl, Tent. Fl. Boh. i. 41 (1810); Willd. Enum. Supp. 3–4 (1813).

720. *Dipsacus sylvestris* Huds. Fl. Angl. ed. 1, 49 (1762); Mill. Gard. Dict. ed. 8, n. 1 (1768). — The identical name which was used by Gerard in 1597.

729. *Aster salicifolius* "Scholl. Fl. Bard. Supp. 328" (1785).—Quoted by Willd. Sp. Pl. iii. 2040 (1800), when publishing his *A. salignus*. I am asked why the former name should be ignored. There is an earlier *A. salicifolius* Lam. Encyc. i. 306 (1783), which Dr. Asa Gray queries as being the same as Aiton's Hort. Kew, ed. 1, i. 303 (1789); until this point is cleared up, the name is not available.

740. *Antennaria margaritacea* Gaert. Fruct. ii. 410 (1791); Gray, Nat. Arr. ii. 459 (1821); R. Br. in Trans. Linn. Soc. xii. (1818), 123.—Brown is not the author of the species.

760. *Diotis candidissima* Desf. Fl. Abl. ii. 261 (1798).—Here we have another instance of a monotypic genus, accepted by later writers, who yet adopt the specific name bestowed more than twenty years after by Cassini, *D. maritima* Cass. Dict. xiii. 295 (1819). This last combination of generic and specific names seems to have been independently put forth by Cosson, Not. Pl. Crit. 39 (1844?), quoted as Coss. MSS. by Reichb. Ic. Fl. Germ. xvi. 55 (1854), and it has got into Syme and Willkomm and Lange; hence the question asked whether *Cass.* should not read *Coss.* Poiret is also cited as the author of the name, but I have failed to find his connection with it.

777. *Petasites officinalis* Mœnch, Meth. 568 (1794), takes the place of *P. vulgaris* Desf. Fl. Atl. ii. 270 (1798).

785. *Senecio erucifolius* L. Fl. Suec. ed. 2, 291 (1755), with a reference to Sp. Pl. ed. 1, 869, where the plant itself is described, but no trivial name is given in the margin. Hudson cites Linnæus, but is not the author of the species.

792. *S. spathulæfolius* DC. Prodr. vi. 362 (1837) was not spelled by him *spathulifolius*.

798. *Carduus pycnocephalus* "Jacq."; Benth. Handb. ed. 1, 313 (1858).—According to Syme, we have not the typical form in this country, it being South-European. *C. tenuiflorus* Curt. Fl. Lond. f. vi. t. 55, would therefore perhaps be better to employ in the case.

799. Mr. Roper points out that *Carduus nutans* × *crispus* = *C. Newbouldi* H. C. Wats. Comp. 531.

800. *C. crispus*. — The variety *polyanthemos* should be ascribed to Grenier (Fl. Lorr. ed. 2, i. 432).

In the next genus we have numerous alterations to make:—

801. *Cnicus lanceolatus* Willd. Fl. Berol. Prod. 259 (1787), et Sp. Pl. iii. 1666 (1800); Roth, Tent. i. 345 (1788); Hoffm. Fl. Deutsch. 285 (1791).—This statement shows two earlier authorities than Hoffmann.

802. *C. eriophorus* Roth, Tent. i. 345 (1788), earlier than Hoffm. Fl. Deutsch. 285 (1791).

803. *C. palustris* Willd. Fl. Berol. Prod. 260 (1787); Roth, Tent. i. 345 (1788).

804. *C. tuberosus* Roth, Tent. i. 345 (1788); Hoffm. Fl. Deutsch. 286 (1791).

808. *C. acaulis* Willd. Fl. Berol. Prod. 260 (1787); Roth, Tent. i. 346 (1788); Hoffm. Fl. Deutsch. 286 (1791).

888. *Prenanthes purpurea Lam.* is no doubt a printer's error; it should be Linn. Sp. Pl. ed. 1, 797.

891. Mr. Druce writes that *Sonchus arvensis* var. *glabra* Lond. Cat. is the var. *lævipes* of Koch, Syn. ed. 2, 498 (1843).

893, 894. *Tragopogon* was treated as neuter by Linnæus; he therefore wrote *pratense* and *porrifolium*, which Miller followed in his *T. minus*. Grammatically it should of course be masculine.

910. *Vaccinium Oxycoccos* Linn. is now *Oxycoccus palustris* Pers. Syn. i. 419 (1805), Persoon's genus being kept up by Bentham and Hooker.* The numbers therefore need alteration, by the present species *following* Vaccinium.

917. *Polifolia* is a pre-Linnean generic name; a capital letter is therefore used when changed to specific, *Andromeda Polifolia*.

929. *Pyrola minor*, not Swartz, but Linn. Sp. Pl. ed. 1, 396, as Mr. Druce points out.

932. *Moneses* Salisb. ex Gray, Nat. Arr. 403; but no authority is there given for *M. grandiflora*, which accordingly should stand as Gray.

933. *Hypopitys* Adans. Faun. ii. 443 (1763; Crantz Inst. ii. 467 (1766). *H. Monotropa* Crantz, *l. c.*—*Hypopithys* Scop. Fl. Carn. ed. 2, 285 (1772). This is the original form of spelling the genus, *Orobanche quæ Hypopithys dici potest*, C. Bauhin, Prod. 81; Pinax, 88, but Adanson and Crantz adopt the more general form, as above. The species consequently should stand as *H. Monotropa* Crantz, as being six years older than Scopoli's name. I may here point out that Crantz's Institutiones seems practically unknown; it is not quoted even by Pfeiffer in his 'Nomenclator,' although Fenzl cites the names of *Caryophylleæ* which were published in it.

941. *Primula acaulis* L. Fl. Angl. 12; Am. Acad. iv. 97; Hill, Syst. Veg. iii. 25 (1765); Jacq. Miss. i. 158 (1778). *P. vulgaris* Huds. Fl. Angl. ed. 1, 70 (1762). — b. *acaulis* (Hill), earlier than Jacquin. — c. *caulescens* (Koch), six years earlier than Babington, Man. ed. 1.

947. *Cyclamen hederæfolium* [Soland. in] Ait. Hort. Kew, ed. 1, i. 196 (1789); Willd. Sp. Pl. i. 810 (1797), who cites the 'Hortus Kewensis.' Nyman adopts the subsequent name, *C. repandum* Sibth. & Sm., probably regarding the former name as hopelessly confused in its application.

Radiola linoides is mis-spelled on page 180 of my previous communication to the 'Journal of Botany.'

(To be continued.)

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* [Roth's name *Schollera* (Tent. Fl. Germ. i. 170 (1788)) must, however, supersede this: the species is *S. Occycoccus*.—Ed. Journ. Bot.]

A SYNOPSIS OF *TILLANDSIEÆ*.

By J. G. Baker, F.R.S., F.L.S.

(Continued from p. 215).

20. Tillandsia linearis Vellozo Fl. Flumin. iii. t. 128; Wawra in Oester. Bot. Zeitsch. 1880, 221; Itin. Prin. Sax. Cob. 174. *Anoplophytum lineare* Beer Brom. 42. *Phytarhiza linearis* E. Morren in Belg. Hort. 1879, 370.—Tufts densely cæspitose. Leaves about a dozen spread over a short stem, subulate down to the base, recurved, tapering to the point, 3–4 in. long, 1-12th in. diam. low down, densely clothed all over with lepidote scales with small hair-like points. Peduncle very slender, erect, 4–6 in. long; bract-leaves none. Flowers 3–4 in a dense spike; flower-bracts oblong, lepidote, adpressed to the calyx, $\frac{1}{4}$ in. long. Calyx cylindrical, $\frac{1}{3}$ in. long; sepals striated, tightly convolute, acute. Petal-blade spreading, orbicular, bright red, $\frac{1}{4}$ in. diam. Stamens and style not protruded from the calyx.

Hab. South Brazil, *Glaziou* 14345! *Wawra.*

21. T. bandensis Baker. — Root-leaves subterete, ascending, thick and firm in texture, $1\frac{1}{2}$–2 in. long, attenuated gradually to the tip, coriaceous, under 1-12th in. diam. at the base, clothed with deflexed hair-pointed lepidote scales. Peduncle about 3 in. long, slender, flexuose; leaf-bracts none. Flowers 3 in a lax simple spike with a flexuose axis, very ascending; flower-bracts oblong-navicular, acute, green, glabrous, $\frac{1}{3}$–$\frac{1}{2}$ in. long, closely adpressed to the calyx. Calyx $\frac{1}{2}$ in. long, glabrous, greenish; sepals acute. Petal-blade obovate, spreading, red, $\frac{1}{6}$ in. long. Stamens and styles not exserted from the calyx.

Hab. Uraguay, *Tweedie*!

22. **T. tricholepis**, n. sp.— Tufts cæspitose. Leaves about 20 in a dense rosette, linear-subulate, $\frac{1}{8}$ in. broad low down, recurved, 3–4 in. long, tapering gradually to a subulate point, densely clothed all over with lepidote scales with large deflexed hair-like points. Peduncle 4–5 in. long; bract-leaves many, small, adpressed, lonceolate, scariose, imbricated. Flowers 3–4 in a dense spike, very ascending; flower-bracts oblong, acute, glabrous, striated, tightly adpressed to the calyx. Calyx cylindrical, glabrous, $\frac{1}{2}$ in. long; sepals acute, very convolute. Petal-blade spreading, orbicular. bright red, $\frac{1}{4}$ in. diam. Stamens and style not exserted from the calyx.

Hab. South Brazil, *Glaziou* 13243!

23. T. unca Griseb. Pl. Lorentz. 225; Symb. Fl. Argent. 1878, 333.—Tufts cæspitose. Leaves 20 or more to a rosette, ascending, falcate, thick, rigid, linear, densely persistently grey-lepidote, channelled down the face, $\frac{1}{4}$ in. broad at the base, 3–4 in. long, tapering gradually to a long point. Peduncle shorter than the leaves; bract-leaves rigid, lanceolate, erect, pale green, imbricated. Flowers few, arranged in a dense simple distichous spike an inch long; flowers ascending; flower-bracts green, lanceolate, sub-glabrous, $\frac{3}{4}$ in. long. Calyx $\frac{5}{8}$ in. long; sepals lanceolate. Petal

with a very small spreading suborbicular reddish blade. Stamens and pistil not exserted from the calyx.

Hab. Argentine Republic, in Province of Cordoba, on trees near Tarana, *Lorentz*! Not an *Anoplophytum*, as classed by Grisebach.

24. **T. scalarifolia,** n. sp. — Leaves spaced-out over a stem 2–3 in. long, all except the inner spreading horizontally, linear-subulate, 3–4 in. long, rigidly coriaceous, densely persistently lepidote. Peduncle 2–3 in. long; bract-leaves few, with short free points. Inflorescence a dense simple spike 1–1½ in. long, ¼–⅓ in. broad; flower-bracts oblong-lanceolate, lepidote, ½ in. long. Calyx reaching to the tip of the bract. Petal-blade lilac, obovate-cuneate, ¼ in. long and broad. Stamens short.

Hab. Andes of Bolivia, *Pentland*!

25. **T. soratensis,** n. sp.—Leaves densely rosulate, lanceolate-setaceous, 8–10 in. long, ½ in. broad at the base of the blade, tapering gradually into a long convolute point, rigidly coriaceous, densely persistently finely lepidote on both surfaces. Peduncle rather shorter than the leaves; bract-leaves with long setaceous free points. Spikes many, ascending, fascicled in a congested panicle, each about an inch long, ⅓ in. broad; branch-bracts small; flower-bracts oblong-lanceolate, glossy, ⅓ in. long. Calyx a little longer than the bract. Petal-limb violet, obovate-cuneate, ⅓ in. long and broad. Stamens not longer than the calyx.

Hab. Andes of Bolivia, near Sorata, alt. 8000 ft., *Mandon* 1185! Near *T. Duratii*.

26. T. Duratii Visiani Ill. i. 23; Walp. Ann. i. 840. *Phytarhiza Duratii* Visiani in Mem. Instit. Ven. v. (1855), 340, cum icone; Walp. Ann. vi. 69; E. Morren in Belg. Hort. 1879, 370. *Anoplophytum Duratii* Beer Brom. 42. *Wallisia Duratii* E. Morren in Belg. Hort. 1870, 102. *Tillandsia circinalis* Griseb. Pl. Lorentz. 224; Baker in Gard. Chron. 1878, n. s. x. 752. *Phytorhiza circinalis* E. Morren in Belg. Hort. 1879, 370. *Tillandsia revoluta* Burbidge in Garden, 1873, 373.—Leaves 12–20 in a dense rosette, lanceolate-acuminate when fully developed, 6–9 in. long, ½–¾ in. low down, circinate at the apex, channelled down the face, thick and rigid in texture, densely clothed all over with adpressed lepidote scales. Peduncle stout, erect, ½ ft. long; bract-leaves many, adpressed, scariose, imbricated. Flowers in a small compact panicle 3–4 in. long, consisting of several ascending dense spikes; main bracts oblong, an inch long, lepidote; ultimate bracts oblong-lanceolate, lepidote, ½–⅝ in. long. Calyx ½ in. long; sepals acute. Petal-blade spreading, orbicular-cuneate, bright red, ¼ in. diam. Stamens and style not exserted from the calyx.

Hab. Argentine territory, *Lorentz*! Uraguay, *Tweedie*! Durati's original type has smaller leaves than Grisebach's *circinalis*, not circinate at the apex. A plant from Tucuman, cultivated at Hamburg by Prof. Reichenbach, with non-circinate leaves and a few-flowered simple spike, may prove distinct.

27. T. azurea Presl. Rel. Haenk. ii. 124, t. 24; Roem. et Schultes Syst. vii. 1218. *Platystachys azurea* Beer Brom. 263. —

Leaves lanceolate-setaceous, 8–9 in. long, an inch broad at the clasping base, rigidly coriaceous, densely persistently lepidote. Peduncle a foot long; bract-leaves distant, with long free setaceous points. Panicle of about 4 ascending moderately lax spikes 2–2½ in. long; flower-bracts ovate-lanceolate, acute, ¾–1 in. long, the lower lepidote. Calyx a little shorter than the bract. Petal-limb small, obovate-cuneate, lilac.

Hab. Peruvian Andes, near Huanaco, *Haenke*. Nearly allied to *T. purpurea* R. & P.

28. T. PURPUREA Ruiz et Pavon Fl. Peruv. iii. 41, t. 270 A; Roem. et Schultes Syst. vii. 1219; Griseb. Sym. Fl. Argent. 1878, 332. *Platystachys purpurea* Beer Brom. 265. *Phytarhiza purpurea* E. Morren in Belg. Hort. 1879, 370. — Leaves densely rosulate, lanceolate-acuminate, 8–12 in. long, rigidly coriaceous, densely persistently lepidote. Peduncle ½–1 ft. long; bract-leaves distant, with setaceous free points. Panicle of numerous sublax erecto-patent spikes 1–3 in. long; branch-bracts small, ovate; flowers erecto-patent, 8–15 to a spike; rachis slender, flexuose; flower-bracts oblong-lanceolate, glabrous, ⅓ in. long. Calyx reaching to the tip of the bract. Petal-limb violet, obovate-cuneate, ¼ in. long.

Hab. Peru; abundant about Lima, &c., *Pavon*! *Nation*! Oran, *Lorentz*. A plant collected by the American Expedition under Capt. Wilkes at Obragilla is probably a dwarf form with only 1–2 spikes.

29. **T. Mathewsii**, n. sp. — Leaves lanceolate-setaceous, ½ ft. long, nearly an inch broad at the clasping base, rigidly coriaceous, densely persistently argenteo-lepidote on both surfaces. Peduncle ½ ft. long; bract-leaves with long free setaceous points. Panicle 4–5 in. long; spikes few, dense, erecto-patent, sessile, 1½–2 in. long, above ½ in. diam.; lower branch-bracts ovate-navicular, an inch long, with a setaceous free point; flower-bracts ovate, acute, lepidote, ½–¾ in. long. Calyx rather shorter than the bract. Petal-limb violet, obovate-cuneate, ⅙ in. long and broad. Stamens not longer than the calyx.

Hab. Peruvian Andes, on rocks at Tarma and Obragilla, *Mathews* 651!

Subgenus IV. PLATYSTACHYS (Beer, non K. Koch).—Leaves densely rosulate, firm in texture, usually persistently lepidote, narrowed gradually into a long subulate point. Spikes distichous, simple or panicled. Petals with a lingulate blade, not scaled on the claw, usually violet. Style and stamens elongated.

KEY.

Spikes very dense.	
Spikes simple	Sp. 30–42.
Spikes panicled.	
Dwarf species under a foot high .	Sp. 43–50.
Tall species over a foot high . .	Sp. 51–78.
Spikes moderately dense.	
Spikes simple	Sp. 79–89.
Spikes panicled	Sp. 90–97.

Spikes lax.

Spikes simple	Sp. 98–105.
Spikes panicled	Sp. 106–115.

30. T. PUMILA Griseb. in Gott. Nacht. 1864, 16, non Lindl.—Habit of *T. pruinosa*, but the lepidote scales adpressed, not loose. Leaf-blade convolute, longer than the dwarf flower-stem. Spike short, simple; flower-bracts oblong-lanceolate, acute, squamulose, ½ in. long. Calyx rather shorter than the bract; posticous sepal oblong, obtuse, the two others acute. Capsule an inch long.

Hab. Venezuela; mountains of Tovar, alt. 3000 ft., *Fendler* 2163.

31. **T. chontalensis,** n. sp.—Leaves in a dense rosette; outer with a large ovate utriculate base 1–1½ in. long; blade linear-subulate, recurved, rigidly coriaceous, thinly lepidote, 2–3 in. long, deeply channelled all down the face. Peduncle 3 in. long; bract-leaves crowded, long-pointed. Spike densely simple, 2–3 in. long, ½–¾ in. broad; bract leaves oblong-lanceolate, acute, thinly lepidote, ¾–1 in. long. Calyx shorter than the bract. Petal-blades oblong, convolute, ¼ in. long.

Hab. Nicaragua; Chontales, *Ralph Tate* 413! Like *T. fasciculata* on a dwarf scale, with a simple spike.

32. **T. brachypoda,** n. sp. — Leaves many in a dense rosette; dilated base ovate, an inch broad; blade lanceolate-setaceous, rigidly coriaceous, ½ ft. long, ½ in. broad low down, tapering gradually to the point, densely finely persistently lepidote. Peduncle 2–3 in. long; bract-leaves crowded, with short free points. Inflorescence a dense simple spike 4 in. long, ½ in. broad; flower-bracts oblong-lanceolate, naked, ¾ in. long. Calyx reaching nearly to the tip of the bract. Petal-blade oblong-unguiculate, as long as the calyx. Stamens and style longer than the petals.

Hab. Mountains of Venezuela, *Fendler* 1527!

33. T. PRUINOSA Swartz, Fl. Ind. Occ. i. 594; Roem. et Schultes, Syst. vii. 1205; Griseb. Gott. Nacht. 1864, 16; Flora Brit. West. Ind. 596; E. Morren in Belg. Hort. 1876, 257, t. 16–17. *Platystachys pruinosa* Beer, Brom. 265. *T. breviscapa* Sagra, Fl. Cub. iii. 265.—Whole plant 3–6 in. high. Leaves linear-subulate from an ovate ventricose base an inch long; blade 3–4 in. long, ¼ in. broad at the base, persistently covered all over both surfaces with loose lepidote scales. Peduncle very short, quite hidden by the long-pointed bract-leaves. Spike dense, simple, erect, oblong, 1–2 in. long, ¾–1¼ in. diam.; flower-bracts ovate, acute, ¾–1 in. long, laxly persistently lepidote. Calyx glabrous, reaching to the tip of the bract. Petals lilac, connivent in a cylindrical tube ½ in. longer than the calyx. Stamens exserted.

Hab. Cuba, *Poppig*! *Wright* 686! Jamaica, *Swartz*. Mountains of Venezuela, alt. 5000 ft., *Fendler* 2448! Para, *Herb. Lindley*! Brazil, *Glaziou* 15462!

34. T. TORTILIS Klotzsch inedit.; E. Morren in Bourg. Brom. No. 97. *Platystachys tortilis* Beer, Brom. 266. — Leaves densely rosulate, linear-subulate, recurved, rigidly coriaceous, 4–6 in. long, convolute down the base, densely clothed on both surfaces with lax

glittering lepidote scales. Peduncle 2–3 in. long; bract-leaves crowded, with long free points. Inflorescence a dense simple or sometimes branched spike 1–1½ in. long; flower-bracts lanceolate, acute, lepidote, an inch long. Calyx distinctly shorter than the bract. Petal-blades yellow, convolute in a tube ½ in. long. Stamens shorter than the petals. Capsule an inch long.

Hab. Valley of Mexico, *Bourgeau* 97! Mountains of San Luis, Potosi, alt. 6000–8000 ft., *Parry & Palmer* 872! Also Christy!

35. T. VESTITA Cham. et Schlecht. in Linnæa, xviii. 423; Mart. et Gal. Enum. ii. 8. *T. Schiedeana* Steudel. *T. flavescens* Mart. et Gal. Enum. *l. c.*—Basal leaves spaced out over a short stem, linear-subulate, 6–8 in. long, ⅙ in. broad at the very base, rigidly coriaceous, strongly convolute, densely persistently laxly lepidote all over. Peduncle 2–3 in. long, red, pruinose; bract-leaves with long free filiform points. Inflorescence a few-flowered dense erect simple spike 1½–2 in. long; flower bracts lanceolate, bright red, glabrous, an inch long. Calyx reaching to the tip of the bract. Petal-blades yellow, convolute in a cylindrical tube an inch long. Style and stamens a little longer than the petals. Capsule 1½ in. long.

Hab. Mexico; Xalapa, *Schiede & Deppe*! *Galeotti* 4908, 4912. Orizaba, *Bilimek*! *F. Mueller* 1239! Fortin, *Kerber* 295! Valley of Mexico, *Bourgeau* 2179! Yucatan and Tabasco, *E. K. Johnson* 84! Described from a plant that flowered at Kew in March, 1887, received from Messrs. Shuttleworth.

36. **T. pachycarpa**, n. sp. — Leaves densely rosulate, above a foot long, linear-lanceolate from a dilated base 1½ in. broad; blade rigidly coriaceous, not lepidote, ½–¾ in. broad low down; apex not setaceous. Peduncle much shorter than the leaves; bract-leaves small. Spike dense, simple, 3–4 in. long; flowers 8–9 on a side, erecto-patent; flower-bracts ovate-oblong, obtuse, ¾ in. long. Calyx ½ in. long; sepals obtuse. Corolla not seen. Capsule an inch long; valves very thick and woody.

Hab. Trinidad, *Fendler* 829!

37. T. ERUBESCENS Schlecht. in Linnæa, xviii. 427. — Leaves densely rosulate, linear-subulate, 4–5 in. long, softly white-lepidote on both surfaces. Stem simple, as long as the leaves. Spike simple, 3 in. long; flower-bracts ovate-navicular, lepidote. Calyx naked, above an inch long. Petal-blade lanceolate, acute. Stamens and style protruded beyond the petals.

Hab. Mexico; St. Angel, St. Bartolo, *Schiede*. Not seen. Near *T. xiphostachys* Griseb.

38. T. XIPHOSTACHYS Griseb. in Gott. Nacht. 1864, 14. *Vriesea xiphostachys* Hook. in Bot. Mag. t. 5287. *T. complanata* E. Morren in Belg. Hort. 1872, 300, t. 23, non Benth. — Leaves 30–40 in a dense rosette; dilated base ¾ in. diam.; blade linear-setaceous, 6–9 in. long, rigidly coriaceous, thinly persistently lepidote, especially on the back. Peduncle as long as the leaves, bright red; bract-leaves small. Inflorescence a simple erect dense spike 4–6 in. long, ¾–1 in. diam.; flower-bracts oblong, acute, lepidote, an inch long, ½ in. broad, the lower red, the upper green. Calyx reaching nearly to the tip of the bract. Petal-limbs lilac, convolute in a tube

nearly as long as the calyx. Style and stamens longer than the petals.

Hab. Mexico, near Cordoba, *teste Morren*. Mountains of Venezuela, alt. 3000 ft., *Fendler* 3447. Was first described from cultivated specimens that flowered at Kew in 1861.

39. **T. brevifolia,** n. sp. —Leaves densely rosulate, 5–6 in. long; dilated base ovate, ¾ in. broad; blade lanceolate-setaceous, ½ in. broad at the base, tapering gradually to the point, rather thin in texture, densely finely persistently lepidote on both surfaces. Peduncle a foot long; lower bract-leaves with short setaceous points; upper entirely adpressed. Inflorescence a simple erect dense spike 2–3 in. long, ½ in. broad; flower-bracts oblong-lanceolate, lepidote, ¾ in. long. Calyx ½ in. long. Petals not seen. Capsule twice as long as the calyx.

Hab. Andes of Ecuador, *Lehmann*! Ambato, *Pearce*! Nearly allied to *T. xiphostachys*.

40. T. TRIGLOCHINOIDES Presl Reliq. Haenk. ii. 125; Roem. et Schultes, Syst. vii. 1205; Benth. Plant. Hartweg. 124.—Leaves in a dense rosette; dilated base ovate, ¾ in. broad; blade lanceolate-setaceous, ½–1 ft. long, rigidly coriaceous, densely persistently lepidote. Peduncle 6–9 in. long; bract-leaves entirely adpressed. Inflorescence a dense simple spike 6–9 in. long, ⅓ in. diam.; flower-bracts oblong-lanceolate, naked, ½ in. long. Calyx reaching nearly to the tip of the bract. Petal-limb small, oblong, cream-coloured. Capsule ½ in. long.

Hab. Guayaquil, *Haenke, Hartweg* 699! *Edmonstone*.

41. **T. Barclayana,** n. sp. — Leaves forming a dense rosette; dilated bases ovate, 3–4 in. long; blade linear-subulate, above a foot long, ½ in. broad low down, rigidly coriaceous, obscurely lepidote. Peduncle a foot long; bracts lanceolate, scariose, imbricated, not leaf-pointed. Spike simple, a foot long; rachis stout, very pubescent; flowers not so dense as in *T. anceps*, ascending; flower-bracts oblong, obtuse, an inch long. Calyx reaching to tip of the bract. Petals not seen.

Hab. Ecuador; woods of Valdivia, *Barclay* 822! (year 1836), (Herb. Mus. Brit.). Near *T. anceps* Lodd. and *T. incurva* Griseb.

42. T. ANCEPS Lodd. Bot. Cat. t. 771. *Platystachys anceps* Beer, Brom. 80. *Phytorhiza anceps* E. Morren in Belg. Hort. 1879, 368, t. 20–21. *T. compressa* Bertero; Roem. et Schultes, Syst. Veg. vii. 1210; Griseb. Fl. Brit. West Ind. 395. *T. setacea* Hook. in Bot. Mag. t. 3275, non Sw. *Platystachys setacea* Beer, Brom. 80. *T. tricolor* Cham. et Schlecht. in Linnæa, vi. 54; Schlecht. in Linnæa, xviii. 423; E. Morren in Belg. Hort. 1879, 162, t. 10–11. *P. tricolor* Beer, Brom. 266.—Leaves in a dense rosette, linear-acuminate from an ovate base 2–3 in. long, 1½–2 in. broad; blade a foot long, ½–¾ in. broad low down, tapering gradually to a long point, rigidly coriaceous, thinly lepidote; edges incurved. Peduncle much shorter than the leaves; bract-leaves crowded, with long stiffly erect free points. Spike dense, erect, simple, rarely branched, 6–8 in. long, 1½–2 in. diam.; flower-bracts ovate, acute, subglabrous, 2 in. long, yellow with a red edge, above an inch broad low down. Calyx

rather shorter than the bract. Corolla violet, cylindrical, 2½–3 in. long. Stamens exserted.

Hab. Jamaica, *Masson*! *Wright*! *Purdie*! Trinidad, *Fendler* 832! Porto Rico, *Sintenis* 473! Central Mexico, Xalapa, &c., *Schiede* 1006, *Bourgeau* 2961; 3075! *Hahn*!

43. T. BULBOSA Hook. Exot. Flora, t. 173; Roem. et Schultes, Syst. Veg. vii. 1211; Sagra, Fl. Cub. iii. 266. *Platystachys bulbosa* Beer, Brom. 83. *T. variegata* Schlecht. in Linnæa, xviii. 429; Wittm. in Berl. Gartenzeit. 1885, 193, fig. 44. — Leaves few, laxly rosulate, with connivent ventricose ovate bases 1–2 in. long, and a linear-convolute rigidly coriaceous thinly lepidote curved or wavy blade varying from 2–3 to 6–9 in. long. Peduncle short; bract-leaves few, with long subulate free points. Spikes rarely single, usually several forming a congested panicle, dense, 1–2 in. long, ½ in. diam.; flower-bracts oblong-lanceolate, acute, ½–¾ in. long, glabrous or finely lepidote. Calyx reaching to the tip of the bract. Petals bright lilac, convolute in a tube, an inch longer than the calyx. Stamens longer than the petals. Capsule twice as long as the calyx.

Hab. Florida. *Curtiss* 2845! Cuba, *Wright* 3272! Jamaica, *Purdie*! Trinidad, *Fendler* 823! 824! Guatemala, *Skinner*! Mexico, *Schiede*. Panama, *Hayes*! Columbia, *Cuming* 1191! Demerara, *Appun*! *Jenman*! Surinam, *Hostmann* 560! Cayenne, *Poiteau*! Amazon Valley, near Para, *Spruce*! Buenos Ayres, high up the Parana, *Sullivan*. The six plants (*bulbosa*, *erythræa*, *inanis*, *eminens*, and *pumila*) named as species by Lindley in Paxton's 'Flower Garden,' vol. i., p. 160, seem to be all mere varieties of this species. The most striking are *erythræa* (var. *picta*, Bot. Mag. t. 4288) with bright red leaf-bases and branch-bracts; and *inanis* (Paxt. Flow. Gard. i. 159, figs. 103–104), a tall form, with a simple spike. *T. paucifolia* Baker in Gard. Chron. 1878, 748, is probably also a variety of *bulbosa*, with a simple spike, and leaves more lepidote t an usual.

44. T. CAPUT-MEDUSÆ E. Morren in Belg. Hort. 1880, 90; 1881, 227. — Leaves with a ventricose ovate dilated base and lanceolate-canaliculate arcuate divaricate densely lepidote blade. Peduncle shorter than the leaves; bract-leaves elongated. Panicle compound; spikes about 4, narrow, about 7-flowered; flower-bracts green, lanceolate.

Hab. Mexico. Introduced into cultivation by M. Jacob-Makoy & Co., of Liege, in 1880. Differs from *bulbosa* by its densely lepidote leaves.

45. T. CANESCENS Swartz, Prodr. 57; Fl. Ind. Occ. i. 595; Griseb. Fl. Brit. West Ind. 595; Roem. et Schultes, Syst. vii. 1216; Sagra, Fl. Cub. iii. 268.— Leaves in a dense rosette; ovate base ½–¾ in. broad; blade linear-acuminate, with enrolled edges, 6–9 in. long, ¼–⅓ in. broad low down, rigidly coriaceous, persistently clothed on both surfaces with adpressed lepidote scales. Peduncle generally shorter than the leaves; bract-leaves with long linear free points. Spikes 1–4, crowded, few-flowered; flower-bracts oblong-lanceolate, acute, thinly lepidote, ½ in. long. Calyx as long as the

bract. Corolla tubular, twice as long as the calyx. Capsule-valves lanceolate, an inch long, $\frac{1}{8}$ in. broad.

Hab. Jamaica, *Swartz*! *Wright*! *Purdie*! Cuba, *Wright* 3273! Mexico, *Bourgeau* 2103! Trinidad, *Schacht*!

46. T. SETACEA Sw. Prodr. Fl. Ind. Occ. i. 593; Roem. et Schultes, Syst. Veg. vii. 1207; Griseb. Fl. Brit. West Ind. 595; K. Koch, Ind. Sem. Hort. Berol. 1873, App. 4, p. 6; Baker in Ref. Bot. 288, non Hook in Bot. Mag. t. 3275. *T. tenuifolia* L. Sp. 410, ex parte; Sagra, Fl. Cub. iii. 266 (Sloane Jam. i. 190, t. 122, fig. 1); E. Morren in Belg. Hort. 1876, 199, t. 14. *Diaphoranthema versicolor* Beer, Brom. 155. *Renealmia monostachya* Linn. Herb. *T. juncifolia* Regel, Act. Hort. Petrop. iii. 154; Gartenfl. t. 811. *T. punctulata* Cham. et Schlecht. in Linnæa, vi. 53. *T. Selloa* K. Koch, Ind. Sem. Hort. Berol. 1873, App. 4, p. 7. *T. juncea* Leconte and *T. Bartramii* Elliott; Chapm. Fl. South States, 471. *Bonapartea juncea* R. & P. Fl. Peruv. iii. 38, t. 262?—Leaves 30–40 in a dense rosette, subulate from a small ovate base, $\frac{1}{2}$–1 ft. long, firm in texture, grey-green, finely persistently lepidote all over, $\frac{1}{4}$ in. broad at the dilated base. Peduncle generally shorter than the leaves; upper bract-leaves with short, lower with long, filiform free points. Spikes 1–7, dense, 1–2 in. long, few-flowered, forming a short congested panicle; flower-bracts oblong, obtuse, $\frac{1}{2}$–$\frac{3}{4}$ in. long, persistently lepidote. Calyx $\frac{1}{2}$ in. long. Petals bright violet, twice as long as the calyx, convolute in a cylindrical tube. Stamens longer than the petals. Capsule twice as long as the calyx.

Hab. Georgia, *Elliott*. Florida, *Bartram*! *Ravenal*! *Curtiss* 2847! 2848! Cuba, *Wright* 682! 683! 684! Jamaica, *Shakespeare*! (year 1777), *Masson*! *Purdie*! Trinidad, *Fendler* 825! Mexico, *Beechy*! *Bourgeau* 1773! *Coulter* 1577! Guatemala, *Bernouilli* 1193! Venezuela, *Fendler* 1532! Brazil, *Sello*! Para, *Herb. Lindley*! It seems better to drop the name *tenuifolia*, as Linnæus included under it three widely different species (*setacea*, *polystachya*, and *flexuosa*). The Mexican *T. quadrangularis* Mart. et Gal. Enum. 9 (Galeotti 4917) agrees with *setacea*, except that the flower is said to be yellow.

47. **T. streptocarpa**, n. sp. — Leaves about 20 in a lax basal rosette, linear-subulate, rigidly coriaceous, 6–8 in. long, $\frac{1}{4}$ in. broad, deeply channelled down the lower part of the face, densely finely lepidote all over. Peduncle 6–9 in. long, slender; bract-leaves small, lanceolate, adpressed. Spikes about 3, dense, 1–2 in. long, forming a short panicle; flowers ascending; flower-bracts lanceolate, $\frac{1}{2}$ in. long. Calyx as long as the bract. Petals not seen. Capsule-valves linear, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long.

Hab. Paraguay, *Balansa* 615!

48. **T. vernicosa**, n. sp. — Leaves about 20 in a dense rosette, lanceolate-acuminate, 6–8 in. long, narrowed gradually from a scarcely dilated base $\frac{3}{4}$ in. diam. to the subulate apex, thick, rigidly coriaceous, finely lepidote, pale green, smooth and shining on both surfaces. Peduncle under $\frac{1}{2}$ ft. long; bracts imbricated, only the lower with free points. Spikes about 4, forming a short panicle, dense, 1–2 in. long, under $\frac{1}{2}$ in. diam.; flower-bracts ovate, $\frac{1}{2}$ in.

long. Calyx as long as the bract. Petal-blade white, oblong, ¼ in. long. Stamens and style not protruded beyond the tip of the petal.

Hab. Parana, *Christie*! Described from a living plant that flowered at Kew in October, 1861.

49. **T. myriantha,** n. sp. *T. floribunda* Griseb. in Gott. Nacht. 1864, 15, non H. B. K. — Whole plant 8–12 in. high. Leaves densely rosulate; ovate base 2 in. long, 1½ in. broad; blade lanceolate-setaceous, ½ in. broad at the base, rigidly coriaceous, persistently finely lepidote on both surfaces. Peduncle 6–8 in. long; bract-leaves crowded, with long free points. Inflorescence a dense congested oblong panicle 2–3 in. long; spikes very numerous, erecto-patent, about an inch long; flower-bracts ovate, ½ in. long. Calyx as long as the bract. Petals not seen. Capsule an inch long.

Hab. Mountains of Venezuela, *Fendler* 1530! 1531!

50. T. FLORIBUNDA H. B. K. Nov. Gen. i. 292; Roem. et Schultes, Syst. vii. 1217. *T. coarctata* Willd. Herb. *Platystachys floribunda* Beer, Brom. 264. — Leaves densely rosulate, linear-subulate, 6–8 in. long, rigidly coriaceous, channelled down the face, argenteo-lepidote. Peduncle ½ ft. long, densely leafy. Spikes 2–8, dense, crowded, sessile, an inch long; flower-bracts ovate, acute, ⅓ in. long, red when fresh. Calyx shorter than the bract. Petals violet.

Hab. Peru, near Olleros, and on the slopes of the high mountains Chulucanas and Guamani, *Humboldt*.

51. **T. flabellata,** n. sp. — Leaves in a dense rosette; dilated base ovate, 2 in. long, above an inch broad; blade lanceolate-subulate, above a foot long, much overtopping the flowers, ½–¾ in. broad low down, not rigidly coriaceous, thinly persistently lepidote on both surfaces. Peduncle very short; spikes 6–8, ascending, stalked, dense, about 3 in. long, ½–¾ in. diam.; flower-bracts lanceolate-navicular, acute, an inch long, nearly naked. Calyx half as long as the bract. Capsule cylindrical, a little longer than the calyx.

Hab. Guatemala; Barranco Hondo, alt. 3800 ft., *Salvin*! Collected in October, 1873.

52. T. DISTICHA H. B. K. Nov. Gen. i. 292; Roem. et Schultes, Syst. vii. 1218; Presl, Rel. Haenk. ii. 124. *T. cinerascens* Willd. Herb. No. 6330. *Platystachys cinerascens* Beer, Brom. 263.—Leaves densely rosulate; dilated base ovate, utriculate, ¾–1 in. diam.; lamina linear-subulate, ½–1 ft. long, rigidly coriaceous, convolute down to the very base, thinly persistently lepidote. Peduncle ½–1 ft. long; bract-leaves crowded, with long free setaceous points. Inflorescence a panicle of 6–10 dense simple sessile erecto-patent spikes 2–3 in. long, under ½ in. broad; branch-bracts small; flower-bracts ovate, acute, ⅓ in. long. Calyx ¼ in. long; sepals lanceolate. Petal-limb pale, oblanceolate, as long as the calyx. Capsule-valves linear, 2 in. long.

Hab. Peru, *Humboldt*. Guayaquil, *Haenke*, *Edmonstone*! Atacamas, *Hinds*! Columbia, *Cuming* 1188!

53. T. TECTORUM E. Morren in Belg. Hort. 1877, 328, t. 18. *T. argentea* K. Koch in Wochen. 1868, 161; Berlin Monat. 1876,

t. 3; Ill. Hort. n. s. xix. 213, with woodcut, non Griseb. (1864). *Pourretia nivosa* Hort.—Leafy stem reaching a foot in length; leaves dense, spreading, linear-subulate from a clasping base ⅓–½ in. broad, densely loosely argenteo-lepidote. Peduncle a foot long; bract-leaves with short subulate free points. Spikes 6–8, ascending, densely clustered, 1½–2 in. long, ⅓ in. diam.; branch-bracts small; flower-bracts oblong-lanceolate, ¾ in. long, green, with a reddish tinge. Petal-limbs convolute in a cylindrical tube ½ in. long. Stamens and style not exserted.

Hab. Andes of Peru. Sent to Europe alive by Wallis in 1865–6, and Roezl in 1872.

54. T. DISTACHYA Baker in Gard. Chron. 1880, i. 200.—Leaves 12–15 in a dense rosette; dilated base an inch broad; blade lanceolate-acuminate, above a foot long, not convolute, ½ in. broad at the middle, rigidly coriaceous, thinly lepidote. Peduncle ½ ft. long; bract-leaves with long free linear points. Spikes 2, dense, 1½–2 in. long, ½ in, diam.; flower-bracts oblong-lanceolate, an inch long, not lepidote. Calyx ¾ in. long. Petal-blade oblanceolate, white, ¼ in. long. Stamens and style longer than the petals.

Hab. Honduras, *Gabb*! Described from a living plant that flowered at Kew, January, 1880.

55. T. DIVARICATA Benth. Bot. Sulphur, 174. — Leaves densely rosulate; dilated base ovate, 1 in. diam.; blade lanceolate-setaceous, a foot long, ½ in. broad low down, rigidly coriaceous, densely lepidote. Peduncle as long as the leaves; upper bract-leaves with small circinate linear free points. Panicle deltoid, 4–5 in. long; spikes about 8, sessile, 1½–2 in. long, ½ in. broad, the side ones spreading horizontally; branch-bracts small, ovate; flower-bracts ovate, ½ in. long. thinly lepidote. Calyx reaching nearly to the tip of the bract. Petals narrow, ¼ in. long. Capsule-valves above an inch long, ¼ in. broad.

Hab. Columbia, near Machala, with *T. multiflora*, *Barclay*! *Sinclair*! Collected in October, 1836.

56. T. GLAUCOPHYLLA Baker. *Vriesea glaucophylla* Hook. in Bot. Mag. t. 4415; Flore des Sures, t. 432. *Platystachys glaucophylla* Beer, Brom. 82.—Leaves densely rosulate; ovate base 1 in. diam.; blade lanceolate-setaceous, rigidly coriaceous, 1–1½ in. long, ½ in. broad low down, convolute in the upper half, thinly persistently lepidote. Peduncle much shorter than the leaves; bract-leaves with long erect setaceous points. Panicle a foot long, composed of 4–6 ascending spikes 4–8 in. long, nearly an inch broad; flower-bracts oblong, acute, 1½ in. long, ¾ in. broad, the lower red, the upper green. Calyx naked, 1¼ in. long; sepals lanceolate. Petal-limbs dark lilac, convolute in a cylindrical tube ¾ in. long. Style and stamens longer than the petals.

Hab. Santa Marta, introduced into cultivation by Purdie in 1848.

57. **T. gymnobotrya,** n. sp. — Leaves very numerous in a rosette; dilated base ovate, 1½ in. broad; blade lanceolate-acuminate, 8–9 in. long, ¾ in. broad low down, not rigid in texture, thinly persistently lepidote on both surfaces. Peduncle under a

foot long; bract-leaves with long points. Panicle deltoid, 6–8 in. long; branches many, short, patent; lower compound; lower branch-bracts 3–4 in. long; spikes dense, 1–1¼ in. long, ½ in. broad; flower-bracts oblong-navicular, obtuse, ½ in. long. Calyx reaching nearly to the tip of the bract. Petals not seen.

Hab. Mexico; Province of Orizaba, *Bourgeau* 3076!

58. T. Leiboldiana Schlecht. in Linnæa, xviii. 414; Hemsl. Bot. Cent. Amer. iii. 321. — Leaves densely rosulate; dilated base ovate, 1½ in. broad; blade linear subulate, glabrous, 6–8 in. long. Inflorescence panicled; branch-bracts bright red, longer than the spikes; flower-bracts ½–¾ in. long, pale violet towards the tip. Petals about an inch long.

Hab. Southern Mexico; Barrancas, *Liebold* 180. Hacienda de la Laguna, *Schiede*. Known to me from the description only.

59. T. streptophylla Scheidw. in Hort. Belg. iii. (1836), 152, with figure; E. Morren in Belg. Hort. 1878, 296, t. 18–19; Baker in Bot. Mag. t. 6757. *T. circinnata* Schlecht. in Linnæa, xviii. 427. *Vriesea streptophylla* E. Morren, Cat. 1873, 17. *T. tortilis* Brong. inedit., non Klotzsch. — Leaves in a dense rosette; dilated base ovate, clasping, 2–3 in. long, 1½ in. broad; blade lanceolate-acuminate, more or less spirally twisted, a foot long, ¾–1 in. broad low down, densely finely lepidote on both surfaces. Peduncle 6–9 in. long; bract-leaves crowded, with long free spirally-twisted points. Panicle 6–9 in. long and broad; spikes 6–12, dense, 3–4 in. long, ⅝–¾ in. diam.; flower-bracts ovate, acute, densely lepidote, ¾–1 in. long. Calyx rather shorter than the bract. Petals ½–¾ in. longer than the calyx, bright violet, convolute in a cylindrical tube. Stamens and style ½ in. longer than the petals. Capsule 1–1¼ in. long; valves lanceolate.

Hab. Mosquito Shore, *Capt. Miller*! (year 1744). Central Mexico, *Schiede*, *Malzine*, *Bourgeau*! *Hahn*! Yucatan, *Schott* 274! Jamaica, *Jenman*! (sent to Kew alive in 1879). We have an imperfect specimen of a closely allied species with naked flower-bracts from Guatemala, from Skinner.

60. T. Lorentziana Griseb. Pl. Lorentz. 223; Symb. Fl. Argent. 1878, 332. — Leaves 12–20 in a dense rosette, lanceolate-subulate, rigidly coriaceous, 6–9 in. long, ¾ in. broad above the dilated base, densely finely lepidote on both surfaces. Peduncle 6–9 in. long; lower bract-leaves with long free points. Spikes 3–5, forming a short panicle; dense, ascending, 2–3 in. long, ½ in. diam.; flower-bracts oblong, acute, ¾ in. long, glabrous. Calyx as long as the bract. Petal-blade white, oblong, ½ in. long. Capsule 1¼–1½ in. long.

Hab. Argentine region; Province of Cordoba, *Lorentz*! Paraguay; Cerro San Tomas, near Paraguari, *Balansa* 4744! 613! Allied to *T. polystachya* L.

61. **T. parvispica**, n. sp.— Leaves 20–30 in a rosette; dilated base ovate, 2 in. long; blade lanceolate-subulate, above a foot long, ½ in. broad low down, rigidly coriaceous, densely finely persistently lepidote on both surfaces. Peduncle a foot long; bract-leaves much imbricated, with long free points. Panicle very narrow, 4–5 in.

long; spike short, dense, ascending, the lowest an inch long; lower branch-bracts ovate, with long points; flower-bracts ovate, ½—⅝ in. long. Calyx not protruded beyond the bract. Corolla not seen.

Hab. South Brazil, *Glaziou* 13258!

62. **T. grisea,** n. sp.—Root-leaves not seen. Peduncle 6–8 in. long; bract-leaves few, with large ovate-clasping bases and linear-setaceous rigidly coriaceous densely lepidote free points convolute down to the base. Inflorescence a panicle 3–6 in. long; spikes 3–8, simple, dense, erecto-patent, 1–2 in. long, ½ in. broad; lower bracts with large ovate clasping bases and long setaceous free points; flower-bracts oblong, naked, acutely keeled, ½ in. long. Calyx reaching to the top of the bract. Petals narrow, ¼ in. long.

Hab. Peru, near Lima, *Cuming* 981! Near *T. polystachya* L.

63. T. ANGUSTIFOLIA Swartz, Prodr. 57; Fl. Ind. Occ. i. 596; Roem. et Schultes, Syst. Veg. vii. 1216; Griseb. Flora Brit. West Ind. 595. — Leaves 10–12 in a rosette; dilated base 3 in. long, an inch broad; blade linear-subulate, convolute, 1–1½ ft. long, ¼ in. broad at the middle, finely lepidote on both surfaces. Peduncle much shorter than the leaves; bract-leaves with squarrose subulate free points. Spikes 3–8, dense, ascending, the central one 2–4 in. long, ½ in. broad; flower-bracts oblong-lanceolate, acute, glossy, reddish, ½—⅝ in. long. Calyx reaching to the tip of the bract. Corolla tubular, violet, an inch longer than the calyx. Stamens longer than the petals. Capsule an inch long.

Hab. Jamaica, *Swartz*! Venezuela, alt. 3000 ft., *Fendler* 1258. British Honduras, *Gabb*! Described from a living plant that flowered at Kew in April, 1880.

64. T. POLYSTACHYA L. Sp. 410; Lam. Encyc. i. 13; Roem. et Schultes, Syst. Veg. i. 1216; Sagra, Fl. Cub. iii. 266; Griseb. Fl. Cub. 253.— Leaves densely rosulate; dilated base 2–3 in. long, an inch broad; blade linear-convolute, tapering into a long setaceous point, a foot long, ½ in. broad low down, rigidly coriaceous, minutely lepidote. Peduncle shorter than the leaves; bract-leaves with long free convolute tip. Spikes rarely solitary, usually several in a short panicle, dense, ascending, the end one 2–4 in. long, ½ in. broad; flower-bracts oblong, acute, glabrous, ¾ in. long, ⅓ in. broad. Calyx a little shorter than the bract. Corolla violet, tubular, twice as long as the calyx. Stamens longer than the petals. Capsule-valves an inch long, ⅛ in. broad.

Hab. Cuba, *Wright* 1521! Jamaica, *Wright*! *Purdie*! Dominica, *Imray*! Trinidad, *Fendler* 827! Porto Rico, *Sintenis* 2044! 2170! 2138! Yucatan, *Schoti* 810! 894! Tabasco, *E. P. Johnson*! Maxatlan, *Lieut. Strickland*! Less robust than *T. fasciculata*, with narrower spikes and smaller flower-bracts. Founded by Linnæus on the *Renealmia spica multiplici flore aut cæruleo vel albo* of Plumier, of which there is a good figure amongst his unpublished drawings, made between 1689 and 1697.

65. T. BALBISIANA Roem. et Schultes, Syst. vii. 1212; Griseb. Flora Brit. West Ind. 595; Sagra, Fl. Cub. iii. 267; E. Morren in Belg. Hort. 1879, 98, t. 6–7. — Leaves many in a rosette, with

ventricose ovate utricular bases 2 in. long; blade linear, acuminate, spreading, recurved, rigidly coriaceous, thinly persistently lepidote, 6–9 in. long, ½ in. broad low down. Peduncle a foot long; bract-leaves many, with long recurved linear points, like those of the leaves of the rosette. Spikes 3–8, dense, 2–3 in. long, ½ in. diam., forming a dense short panicle; side-spikes ascending; flower-bracts ovate, acute, ¾ in. long, obscurely lepidote. Calyx rather shorter than the bract. Petals lilac, convolute in a tube, ½ in. longer than the bract. Stamens longer than the petals. Capsule-valves 1½ in. long, under ¼ in. broad.

Hab. S.W. Florida, on the banks of the Caloosa River, *Curtiss* 2846! (distributed as *T. juncea* Leconte). Jamaica, *Purdie*! *Bertero*! *Wright*!

66. T. Kunthiana Gaudich. Atlas Bonité, t. 53; Hemsl. Bot. Cent. Amer. iii. 321. *Platystachys Kunthiana* Beer, Brom. 90.—Leaves in a dense rosette; dilated base ovate, an inch broad; blade lanceolate-acuminate, 6–9 in. long, ½–¾ in. broad low down, rigidly coriaceous, finely persistently lepidote, especially beneath. Peduncle ½–1 ft. long; bract-leaves with long free points. Panicle dense, 4–6 in. long; spikes about 15, ascending, 1½–2 in. long, ⅝–¾ in. broad, not so dense as in *T. polystachya;* branch-bracts small, ovate-cuspidate; flower-bracts oblong, acute, ¾–1 in. long, thinly lepidote. Calyx much shorter than the bract. Petal-blades ½ in. long, convolute in a cylindrical tube. Stamens protruded beyond the tip of the petals.

Hab. Mexico; Valley of Cordova, *Bourgeau* 1777! Also, according to Grisebach, gathered in Cuba by Rugel; and on the mountains of Venezuela, *Fendler* 3527. I follow Prof. Morren in referring Bourgeau's plant to Gaudichaud's, but all the other *Bromeliaceæ* figured by the latter appear to be Brazilian.

67. T. Lescaillei Sauvalle, Fl. Cub. 167. — Leaves linear-lanceolate from a dilated base, much shorter than the stem. Peduncle with imbricated bract-leaves. Panicle with simple distichous branches; flower-bracts suborbicular, twice as long as the internodes. Calyx about as long as the bract; sepals elliptic. Petal-limb ovate, obtuse. Stamens shorter than the petals. Capsule three times the length of the calyx.

Hab. Cuba, *C. Wright* 664. Not seen.

(To be continued.)

SHORT NOTES.

Primula Hybrids.—Early in May I obtained, near Saffron Walden, *Primula veris* × *elatior* and *P. vulgaris* × *elatior*, in good flower, and planted two specimens of each in my garden. Contrary to Mr. Hanbury's experience (p. 224), nearly every flower produced a capsule, containing apparently perfect seeds. I hope to raise plants from these, in order to see whether the offspring continues "true," or reverts to the type of either parent. M. James

Lloyd says, of these three species and *P. variabilis* Goupil (*veris* × *vulgaris*):—"Ces 4 plantes cultivées ensemble produisent des hybrides à l'infini."—Edward S. Marshall.

Arabis alpina in Skye.—The addition of a new alpine plant to the Flora of Great Britain is a matter of high interest. During a short visit to the Island of Skye, I spent two days climbing the various peaks of the Cuchullin range. These mountains are almost uniformly naked rock and very steep, with dangerous cliffs and corries. The summits and ridges are in many parts over 3000 feet. I measured Scur Alister by the aneroid to be 3260 feet above the sea, and I believe it to be higher than Scurna Gillean, which has generally been considered the highest. The cliffs are of intractable quartzite, so steep and bare that there is exceedingly little soil and foothold for any vegetation, and alpine plants are very few: I observed, on July 1st and 4th, the following:—*Alchemilla alpina*, *Arabis petræa*, *Saussurea alpina*, *Oxyria reniformis*, *Saxifraga stellaria*, *Cerastium alpinum*, *Azalea procumbens*, and to my great surprise, *Arabis alpina*, a plant with which I was already familiar, from my travels in Greenland in 1875. During the past six or seven years I have had considerable experience searching for alpine plants among the Irish mountains, and I felt a rare pleasure in climbing these peaks, but I little thought such a prize was waiting for me. *Arabis alpina* is common on the Swiss Alps, extending to Lapland, Greenland and Norway; and I have no doubt as to the correct identification, in which my friend, Mr. A. G. More entirely agrees.—H. C. Hart.

Juncus compressus Jacq. in North Somerset.—I send you specimens of this rush, which grows abundantly in meadows near the River Clew, between Stanton Drew and Pensford, I have also found it, but quite sparingly, in the Keynsham Hams. Dr. Boswell, in E. B. ed. iii., observes that the only characters whereby *J. compressus* can be distinguished from *J. Gerardi*, are its more cæspitose habit, with the stems closer together, and more compressed above; the shorter panicle branches; but especially the larger, rounder, and more obtuse capsules. The plants, however, from both the above-named localities, as well as some which I gathered last year, at Bitton in W. Gloucester, in addition to the characters noted by Dr. Boswell, show in a well-marked manner all the others assigned to the species by most of the authorities, *viz.*, stem with one leaf on in the middle, bract exceeding the panicle, and perianth segment falling short of the obovoid shortly mucronate capsule. *J. compressus*, I believe, has not been recorded previously for any part of the county of Somerset.—David Fry.

Monstrous Flowers of Elm.—I am sending a twig of elm with the flowers strangely altered. The stamens have grown into a very good imitation of immature ovaries or young fruits. In some flowers each winged stamen shows a disposition to produce a flower at the apex, and the stigmatic surface is very apparent, as well as one or two almost perfect anthers and a large number of abortive ones. The tree from which the twig was taken seems to be covered

with similar morphological curiosities, and indeed most of the elm trees on the Mansfield Road, Nottingham, which I have passed daily ever since their flowering began, show a like disposition to monstrosity. I may say that the particular tree from which the specimen was taken exhibited unaltered stamens for many days, but fertilisation seems to have been hindered by excessive cold or lack of sunshine, and so during the last week or ten days the phyllodinous growth noticeable has taken place. This simulation of a female organ by a male organ seems peculiarly interesting and sufficiently uncommon to deserve to be recorded. I may say that I have noticed very few elms in this district developing fruit this year, and of the few that are so doing some show the fruits only on a very few branches on one side of the tree. Very few elms had burst the scale-buds of the leaf at the beginning of May, and the trees generally are very backward in leafing.—JOHN J. OGLE.

A NEW LOCALITY FOR CHEILANTHES MYRIOPHYLLA *Desv.* — This Mexican and South American Fern, which has recently been found growing on the high mountains of the eastern portion of this country, has just been discovered on Santa Cruz Island, one of the chain of islands forming the seaward side of what is known as the Santa Barbara Channel: these islands are distant from the mainland about twenty-five miles, and the fern is probably a remnant of the flora of the period when the Channel Islands formed a portion of the mainland, as the fossil elephant of Santa Rosa Island was a remnant of the fauna of the same period.—LORENZO G. YATES.

NEW PHANEROGAMS PUBLISHED IN PERIODICALS IN GREAT BRITAIN DURING 1886.

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ARISTOLOCHIA RIDICULA *N. E. Br.* Brazil. Gard. Chron. xxvi. 360, fig. 73.—A. SALPINX *Mast.* Paraguay. Id. 456, fig. 92.

ASIMINA INSULARIS *Hemsl.* Yucatan. Ic. Pl. 1514.

*ASTEPHANIA (Compositæ, Buphthalmeæ) AFRICANA *Oliv.* Kilimanjaro. Ic. Pl. 1506.

BALANOPHORA DECURRENS *Fawc.* Philippines. Trans. Linn. Soc. (Bot.) ii. 234, t. 33. — B. FORBESII *Fawc.* Java. Id. 236, t. 33. — B. MULTIBRACHIATA *Fawc.* Sumatra. Id. t. 34. — B. RAMOSA *Fawc.* Java. Id. t. 34.—B. ZOLLINGERII *Fawc.* Java. Id. 234, t. 34.

BEGONIA JOHNSTONI *Oliv.* [*Hook. f.*]. Trop. Africa. Bot. Mag. t. 6899.

BLYXA RADICANS *Ridl.* Trop. Africa. Journ. Linn. Soc. xxii. 236, t. 14.

BOOTTIA ABYSSINICA, B. CRASSIFOLIA, and B. EXSERTA, all of *Ridley.* Trop. Africa. Journ. Linn. Soc. xxii. 239, 240, t. 13.

BRAVAISIA TUBIFLORA *Hemsl.* Yucatan. Ic. Pl. 1516.

BROWNLEEA MADAGASCARICA *Ridl.* Madagascar. Journ. Linn. Soc. xxii. 126.

BULBOPHYLLUM APPROXIMATUM *Rich.* Madagascar. Journ. Linn. Soc. xxii. 117. — B. CONCHIDIOIDES *Ridl.* Id. — B. CORIOPHORUM *Ridl.* Id. 119. — B. CORNUTUM *Ridl.* N. Guinea. J. Bot. 325. — B. KERMESINUM *Ridl.* Id.—B. OPHIUCHUS *Ridl.* Madagascar. Journ. Linn. Soc. xxii. 118.—B. PANICULATUM *Ridl.* N. Guinea. J. Bot. 326. — B. SAUROCEPHALUM *Rchb. f.* Philippines. Gard. Chron. xxvi. 262.

BUXUS MACOWANI *Oliv.* Kaffraria. Ic. Pl. 1518.

*CATANTHERA (Vacciniaceæ) LYSIPETALA *F. Muell.* N. Guinea. J. Bot. 289.

CATASETUM GALERITUM *Rchb. f.* Gard. Chron. xxvi. 616. — C. PILEATUM *Rchb. f.* Id.

CELASTRUS LATIFOLIUS *Hemsl.* China. Journ. Linn. Soc. xxiii. 123. —C. VARIABILIS *Hemsl.* Id. 124.

CEPHALOTAXIS MANNII *Hook. f.* Khasia. Ic. Pl. 1523.

CHONDRORHYNCHA LENDYANA *Rchb. f.* Gard. Chron. xxvi. 103.

CLEMATIS LEIOCARPA *Oliv.* China. Ic. Pl. 1533.

COELOGYNE FOERSTERMANNI *Rchb. f.* Sonda. Gard. Chron. xxvi. 262.—C. PUSTULATA *Ridl.* N. Guinea. J. Bot. 353.—C. STELLARIS *Rchb. f.* Borneo. Gard. Chron. xxv. 8.

CRASSULA RHOMBOIDEA *N. E. Br.* Transvaal. Gard. Chron. xxvi. 714.

CROTALARIA JAMESII *Oliv.* Somali-land. Ic. Pl. 1530.

CYNOSORCHIS AURANTIACA, C. GLANDULOSA, C. SPECIOSA, and C. TENELLA, all of *Ridley*, from Madagascar. Journ. Linn. Soc. xxii. 122–124.

CYPRIPEDIUM CALLOSUM *Rchb. f.* Siam. Gard. Chron. xxvi. 327.—C. PRÆSTANS *Rchb. f.* Papu. Id. xxvi. 776. — C. SANDERIANUM *Rchb. f.* Sunda. Id. xxv. 554.

CYRTOPERA PAPUANA *Ridl.* N. Guinea. J. Bot. 354.—C. REGNIERI *Rchb. f.* Cochin China. Gard. Chron. xxvi. 294.
DELPHINIUM MACROCENTRUM *Oliv.* Trop. Africa. Ic. Pl. 1501.
DENDROCALAMUS FORBESII *Ridl.* N. Guinea. J. Bot. 360.
DENDROBIUM ALBIFLORUM *Ridl.* N. Guinea. J. Bot. 323.—D. BRACTEOSUM *Rchb. f.* Gard. Chron. xxvi. 809.—D. CERASINUM *Ridl.* N. Guinea. J. Bot. 324.—D. FORBESII *Ridl.* Id. 323.—D. HERCOGLOSSUM *Rchb. f.* Malacca. Gard. Chron. xxvi. 487.—D. INAUDITUM *Rchb. f.* Polynesia. Id. 552.—D. NYCTERIDOGLOSSUM *Rchb. f.* Papua. Id. 616.—D. PERENANTHUM *Rchb. f.* Moluccas. Id. 70.—D. POGONIATES *Rchb. f.* Borneo. Id. 199.—D. PUNICEUM *Ridl.* N. Guinea. J. Bot. 324.—D. REPTANS *Ridl.* Id. 323.—D. STRATIOTES and D. STREBLOCERAS *Rchb. f.* Sunda. Gard. Chron. xxv. 266.—D. TRIQUETRUM *Ridl.* N. Guinea. J. Bot. 322.
ECHINOCACTUS JOADII *Hook. f.* Uruguay? Bot. Mag. t. 6867.
EPIDENDRUM FRAUDULENTUM *Rchb. f.* Gard. Chron. xxv. 648.—E. PRISTES *Rchb. f.* Gard. Chron. xxvi. 262.
ERIA FORDII *Rolfe.* Hongkong. Gard. Chron. xxvi. 534.—E. PUBERULA *Ridl.* N. Guinea. J. Bot. 326.
ESMERALDA CLARKEI *Rchb. f.* Himalaya. Gard. Chron. xxvi. 552.
EUCOMIS ZAMBESIACA *Baker.* Zambesi. Gard. Chron. xxv. 9.
EULOPHIA GRACILLIMA *Ridl.* Trop. Africa. J. Bot. 292.—E. MACRA *Ridl.* Madagascar. Journ. Linn. Soc. xxii. 120.
EUONYMUS CARNOSUS *Hemsl.* China. Journ. Linn. Soc. xxiii. 118.—E. GRACILLIMUS *Hemsl.* Id. 119.
EUPHORBIA BURMANICA *Hook. f.* Burma. Ic. Pl. 1548.
EURYA DISTICHOPHYLLA *Hemsl.* China. Journ. Linn. Soc. xxiii. 77.
EURYOPS DACRYDIOIDES *Oliv.* Kilimanjaro. Ic. Pl. 1508.
*FORDIA (Leguminosæ Millettieæ) CAULIFLORA *Hemsl.* China. Journ. Linn. Soc. xxiii. 160, t. 4.
FREYCINETIA ANGUSTISSIMA and F. FORBESII *Ridl.* N. Guinea. J. Bot. 359.
GALTONIA CLAVATA *Baker.* Cape Colony. Bot. Mag. t. 6885.
GONGORA FLAVEOLA *Rchb. f.* Gard. Chron. xxvi. 456.
GOODYERA PAPUANA *Ridl.* N. Guinea. J. Bot. 355.
GRISELINIA ALATA *Ball.* Chili. Journ. Linn. Soc. xxii. 163.
GYNURA VALERIANA *Oliv.* Kilimanjaro. Ic. Pl. 1507.
HABENARIA COMBUSTA *Ridl.* Trop. Africa. J. Bot. 294.—H. CONOPODES *Ridl.* Madagascar. Journ. Linn. Soc. xxii. 124.—H. EBURNEA *Ridl.* Trop. Africa. J. Bot. 293.—H. FOXII *Ridl.* Madagascar. Journ. Linn. Soc. xxii. 124.—H. ICHNEUMONIFORMIS *Ridl.* Id. 125.—H. LEPTOBRACHIATA *Ridl.* Trop. Africa. J. Bot. 293.—H. MILITARIS *Rchb. f.* Cochin China. Gard. Chron. xxvi. 518.—H. VARIABILIS, H. VOGELII, and H. WILFORDII, all of *Ridley.* Trop. Africa. J. Bot. 293–5.
HÆMANTHUS BAURII *Baker.* Kaffraria. Bot. Mag. t. 6875.
HEBENSTREITIA ANGOLENSIS *Rolfe.* Angola. J. Bot. 174.
HOLOTHRIX GLABERRIMA *Ridl.* Madagascar. Journ. Linn. Soc. xxii. 125.—H. MONTIGENA *Ridl.* Trop. Africa. J. Bot. 295.
HYPERICUM LONGISTYLUM *Oliv.* China. Ic. Pl. 1534.

Ilex ficoidea *Hemsl.* China. Journ. Linn. Soc. xxiii. 116.
Impatiens furcillata *Hemsl.* China. Journ. Linn. Soc. xxiii. 101. —I. plebeja *Hemsl.* Id.—I. tubulosa *Hemsl.* Id. 102.
Itea ilicifolia *Oliv.* China. Ic. Pl. 1538.
Kalanchoe carnea *N. E. Br.* Gard. Chron. xxv. 298.
Karatas amazonica *Baker.* Amazon. Gard. Chron. xxv. 814.
Lachenalia Massoni *Baker*, L. succulenta *Masson MSS.* [*Baker*], and L. undulata *Masson MSS.* [*Baker*]. Cape. J. Bot. 336.
Lagarosiphon densus *Ridl.* Madagascar. Journ. Linn. Soc. xxii. 235.—L. Nyassæ *Ridl.* Trop. Africa. Id. 234.—L. rubella *Ridl.* Trop. Africa. Id. 234.
Linospadix Forbesii *Ridl.* N. Guinea. J. Bot. 358.
Liparis Beccarii *Ridl.* Journ. Linn. Soc. xxii. 284.—L. Beddomei *Ridl.* India. Id. 268.—L. clavigera *Ridl.* Java. Id. 294.—L. Cumingii *Ridl.* Malacca. Id. 292.—L. cuspidata *Ridl.* Society Is. Id. 266.—L. Forbesii *Ridl.* Java. Id. 283.—L. Griffithii *Ridl.* India. Id. 285.—L. Hookeri *Ridl.* India. Id. 288.—L. lacerata *Ridl.* Borneo. Id. 284.—L. pectinata *Ridl.* Philippines. Id. 277.—L. platyphylla *Ridl.* India. Id. 264.—L. puncticulata *Ridl.* Madagascar. Id. 119.—L. pusilla *Ridl.* India. Id. 294.—L. triloba *Ridl.* Philippines. Id. 295.—L. xanthina *Ridl.* Madagascar. Id. 275.
Lissochilus Taylori *Ridl.* Trop. Africa. J. Bot. 293.
Manettia asperula *Ball.* Colombia. Journ. Linn. Soc. xxii. 142.
Masdevallia astuta *Rchb. f.* Costa Rica. Gard. Chron. xxvi. 584. —M. striatella *Rchb. f.* Id. 703.
Massonia læta *Masson MSS.* [*Baker*], and M. latebrosa *Masson MSS.* [*Baker*]. Cape. J. Bot. 336.
Maxillaria Endresii *Rchb. f.* Costa Rica. Gard. Chron. xxv. 680.—M. fucata *Rchb. f.* Id. xxvi. 616.
Melanorrhœa Curtisii *Oliv.* Penang. Ic. Pl. 1513.
Melodorum Oldhami *Hemsl.* China. Journ. Linn. Soc. xxiii. 27.
Meliosma Fordii *Hemsl.* China. Journ. Linn. Soc. xxiii. 144.—M. patens *Hemsl.* Id. 145.
*Micropora (Laurineæ, Perseaceæ) Curtisii *Hook. f.* Penang. Ic. Pl. 1547.
Microstylis bella *Rchb. f.* Sunda. Gard. Chron. xxv. 8.
Myrmecodia Beccarii *Hook. f.* Trop. Australia. Bot. Mag. t. 6883.
Mystacidium viride *Ridl.* Madagascar. Journ. Linn. Soc. xxii. 122.
Neillia sinensis *Oliv.* China. Ic. Pl. 1540.
Nerine Moorei *Leichtlin.* Gard. Chron. xxvi. 681.
Neuwiedia calanthoides *Ridl.* N. Guinea. J. Bot. 355, t. 271.
Notothixos malayanus *Oliv.* Penang. Ic. Pl. 1519.
Oberonia Hamadryas *Ridl.* N. Guinea. J. Bot. 322.
Ocimum tomentosum *Oliv.* Somali-land. Ic. Pl. 1529.
Odontoglossum Harryanum *Rchb. f.* Gard. Chron. xxvi. 486.
*Oligobotrya (Liliaceæ, Polygonateæ) Henryi *Baker.* China. Ic. Pl. 1537.
Oncidium lepturum *Rchb. f.* Bolivia. Gard. Chron. xxv. 41.—O. pardoglossum *Rchb. f.* Id. 617.—O. Pollettianum *Rchb. f.* ("n. sp. (hyb. nat. ?)"). Id. xxvi. 327.

*Orchidantha (Scitamineæ) borneensis *N. E. Br.* Gard. Chron. xxvi. 519.

Ottolia plantaginea "*Welw. MSS.*" [*Ridl.*], and O. vesiculata *Ridl.* Trop. Africa. Journ. Linn. Soc. xxii. 237, 238.

Parameria densiflora *Oliv.* Penang. Ic. Pl. 1520.

Passiflora Watsoniana *Mast.* Brazil? Gard. Chron. xxvi. 648, figs. 126, 127.

Phreatia albiflora *Ridl.* and P. papuana *Ridl.* N. Guinea. J. Bot. 326, 327.

*Plagiospermum (Celastrineæ) sinense *Oliv.* N. China. Ic. Pl. 1526.

Polygala fallax *Hemsl.* China. Journ. Linn. Soc. xxiii. 59. — P. hongkongensis *Hemsl.* Id. 60, t. 2. — P. Mariesii *Hemsl.* Id. 61, t. 2.

Portuluca somalica *N. E. Br.* Somali-land. Gard. Chron. xxvi. 134.

Pratia borneensis *Hemsl.* Borneo. Ic. Pl. 1532.

*Psilopeganum (Rutaceæ) sinense *Hemsl.* China. Journ. Linn. Soc. xxiii. 103, t. 3.

Psilotrichum africanum *Oliv.* Trop. Africa. Ic. Pl. 1542.

Ptychosperma caryotoides *Ridl.* N. Guinea. J. Bot. 358.

Ranunculus Baurii *Oliv.* S. Africa. Ic. Pl. 1503. — R. Cooperi *Oliv.* S. Africa. Id. 1502. — R. Polii *Franchet.* China. Journ. Linn. Soc. xxiii. 15.

Rhamnus rugulosus *Hemsl.* China. Journ. Linn. Soc. xxiii. 129.

*Rhynchanthus longiflorus (Scitamineæ) *Hook. f.* Burma. Bot. Mag. t. 6861.

Ruellia discifolia *Oliv.* Somali-land. Ic. Pl. 1511.

Sabia Swinhoei *Hemsl.* China. Journ. Linn. Soc. xxiii. 144.

Satyrium gigas *Ridl.* Madagascar. Journ. Linn. Soc. xxii. 126.

Saurauja Oldhami *Hemsl.* China. Journ. Linn. Soc. xxiii. 79.

Schomburgkia chionodora *Rchb. f.* Central America. Gard. Chron. xxv. 73.

Selago alopecuroides *Rolfe* and S. Welwitschii *Rolfe.* Angola. J. Bot. 175.

Slœtia penangiana *Oliv.* Penang. Ic. Pl. 1531.

*Somalia (Acanthaceæ, Justiceæ) diffusa *Oliv.* Somali-land. Ic. Pl. 1528.

Spathoglottis Augustorum *Rchb. f.* Sunda. Gard. Chron. xxv. 9. —S. stenophylla *Ridl.* N. Guinea. J. Bot. 354.

Stellaria rhaphanorrhiza *Hemsl.* China. Journ. Linn. Soc. xxiii. 69.

Streptocarpus Dunnii *Hook. f.* Transvaal. Bot. Mag. t. 6903.

Swietenia macrophylla *King.* Honduras? Ic. Pl. 1550.

*Syndiclis (Laurineæ, Perseaceæ) paradoxa *Hook. f.* Bhotan. Ic. Pl. 1515.

Tapeinochilus pubescens *Ridl.* N. Guinea. J. Bot. 356.

Tephrosia oraria *Hance.* Hongkong. J. Bot. 17.

Thevetia Gaumeri *Hemsl.* Yucatan. Ic. Pl. 1517.

Trichoglottis leontoglossa *Ridl.* N. Guinea. J. Bot. 355.

Tritonia Wilsoni *Baker.* S. Africa. Gard. Chron. xxvi. 38.

Thrixspermum indusiatum *Rchb. f.* Sunda. Gard. Chron. xxv. 585.

VANDA DEAREI *Rchb. f.* Sunda. Gard. Chron. xxvi. 648. — V. LINDENI *Rchb. f.* Id. 70.
VERONICA MYRSINOIDES *Oliv.* Kilimanjaro. Ic. Pl. 1509.
VIOLA ROSSII *Hemsl.* China. Journ. Linn. Soc. xxiii. 54. — V. WEBSTERI *Hemsl.* Id. 56.
VITIS HENRYANA *Hemsl.* China. Journ. Linn. Soc. xxiii. 132. — V. PACHYPHYLLA *Hemsl.* Id. 135.—V. UMBELLATA *Hemsl.* Id. 137.
ZANTHOXYLUM DISSITUM *Hemsl.* China. Journ. Linn. Soc. xxiii. 106.—Z. PODOCARPUM *Hemsl.* and Z. SETOSUM *Hemsl.* Id. 107.
ZINGIBER BREVIFOLIUM *N. E. Br.* Philippines. Gard. Chron. xxvi. 390.
ZIZYPHUS AFFINIS *Hemsl.* Perak. Ic. Pl. 1544.

NOTICES OF BOOKS.

Rabenhorst's Kryptogamen Flora von Deutschland, Oesterreich und der Schweiz. Zweite Auflage. Die Meeresalgen von Dr. FERDINAND HAUCK (Leipsig: Kummer, 1885).

As the first instalment of a series of notices of the several parts of this great book, I propose to take Dr. Hauck's volume on the Algæ. The opportunity may be taken, however, to call special attention to the rapid progress (considering the labour involved) of the section dealing with the Fungi, and to hope that Dr. Winter, to whom this work is entrusted, may soon be restored to health and strength from the serious illness from which he has suffered during recent months. Enough has been issued of the volume on Mosses to give promise of a work of enduring value.

Dr. Hauck's volume on the Sea-weeds has been finished for some time, and if this review of it be behind date it may have this merit, that the opinion of the reviewer is the fruit of experience of the use of the book, and no mere statement framed on a rapid survey of its pages. It has therefore been subjected to a test believed to be sufficient to enable the writer to state in the most unqualified way that for accuracy in details of all kinds—not merely in the citation of authorities, but in the descriptions themselves—the book has few rivals.

To those who are accustomed to our British systematic books on sea-weeds, the classification and nomenclature may at first seem strange; old names which are as familiar friends have given place to others which claim precedence by the laws of nomenclature. The *Rhodophyceæ* (*Florideæ*) come first, and this great natural group presents little change to those familiar with Agardh's masterly treatment of it in the 'Species, Genera, and Ordines Algarum.' The first family, *Porphyraceæ*, consisting of *Bangia* and *Porphyra*, will doubtless make British algologists of the old school pause; indeed, algologists of all schools still regard this position with some misgiving. There is so much to be said, and so much is said forcibly, on both sides of the question that I for one look on the matter in its present position with resignation, adopting the view that these genera are Floridean, but without desire to do

battle for it. In the *Phæophyceæ* the British student will find much novelty, and of an excellent kind; while the *Chlorophyceæ* and *Cyanophyceæ* are treated with like excellence.

That the descriptions are in German may be a bar to the use of the book in this country by numbers of students of sea-weeds, but a large and growing class of our countrymen and countrywomen may be expected to appreciate books such as this. So many of the Algæ dealt with are common on our shores that its use is a matter of necessity to all serious lovers of our marine flora. A corresponding book on British Algæ is more needed now than at any time since the study has been earnestly taken up. The botanists of this country have done so much in the advance of Algology that to lag behind now is unworthy of the countrymen of Turner, Greville, and Harvey. It is interesting to note how much higher a standard of excellence has been reached by British algologists than by British fungologists, excepting, of course, Berkeley and Broome. Access to the study is so specially easy in this country that it may be regarded as a national duty to keep a Greville always with us, though it is hard now to descry signs of a coming one.

This book is in one respect a *reductio ad absurdum* of the stupid practice of producing floras dealing with regions politically delimited. One is carried from the North Sea to the Adriatic to and fro in a fashion with which the student of a local flora finds it hard to keep pace. The comparison of the two floras is interesting, though this is hardly the best way to make it. The day, it may be hoped, is not far distant when the practice will begin of treating marine floras with reference to sea-basins and to ocean regions mapped out on the basis of currents and range of temperatures.

This notice cannot be properly concluded without commendation of the wholly excellent illustrations and the accurate and useful index.

G. Murray.

The last issued part (June) of the 'Icones Plantarum' contains descriptions and figures of three new genera: *Lasiococca* Hook. f. (Euphorbiaceæ Acalypheæ), from the Sikkim Himalayas; *Megistostigma* Hook. f. (Euphorbiaceæ Plukenetieæ), from Malacca; and *Trapella* Oliv. (Pedalineæ), from China.

The recently-issued part (fasc. i. anno iii.) of the 'Annuario del R. Istituto Botanico di Roma' contains the following papers:—"Contribuzione all' Algologia italiana," by E. Martel; "Le diatomee fossili del terreno quaternario di Roma," by M. Lanzi; "I vari laticiflori ed il sistema assitrilatore" (with 5 plates), by L. Marcatili; "Sulla distribuzione dei farci fibroras colari nel loro decorso dal fusto alla foglia," by C. Acqua; "Osservazioni sul *Poterium spinosum*," by R. Pirotta; "Contribuzione allo studio delle anomalie di struttura nelle radici delle Dicotiledoni" (with 2 plates), by C. Avetta.

Prof. Areschoug sends us the first portion of his "Observations on the genus *Rubus*," which is devoted to "comparative examinations of the *Rubi* in the Scandinavian Peninsula." We hope to

publish, at an early date, some notes by our veteran batologist, Prof. Babington, on this important work.

Dr. George Vasey's 'Report on certain Grasses and Forage plants for cultivation in the South and South-West' (Washington, 1887), contains many useful notes and 16 plates—among them one of *Erodium cicutarium*, "popularly known as Alfilaria, and a valuable and nutritious forage plant."

The Belfast Naturalists' Field Club has done well to issue, in volume form, the "Systematic Lists illustrative of the Flora, Fauna, Palæontology and Archæology of the North of Ireland," published by them in connection with their Annual Reports for 1870 onwards. The lists which more especially concern us are those of the Mosses, by Mr. S. A. Stewart, and of the Fungi, by Mr. H. W. Lett. It would be well if other Field Clubs would issue, in this way, such portions of their Reports as are of permanent value.

Articles in Journals.

American Naturalist (June). — R. E. C. Stearns, '*Arauja albens* as a Moth-Trap.'— E. Sturtevant, 'History of Garden Vegetables.' —L. H. Bailey, 'Origin of Tomato from Morphological Standpoints' (1 plate).—W. J. Beal, 'Germination of Lima Beans' (1 plate).

Ann. & Mag. Nat. Hist. (July). — G. Murray, 'Catalogue of Ceylon Algæ in British Museum Herbarium' (*Halymenia imbricata* Dickie MS., *Batrachospermum Thwaitesii* Dickie MS., spp. nn.).

Botanical Gazette (June). — W. E. Stone, 'Occurrence and functions of certain nitrogenous bodies in plants.' — J. D. Smith, 'Undescribed Plants from Guatemala' (*Vochysia guatemalensis*, *Hamelia calycosa*, *Ardisia pectinata*, *Myriocarpa heterospicata*, *Nephrodium Tuerckheimii*, spp. nn.). — J. M. Coulter & J. N. Rose, '*Umbelliferæ* of E. United States' (1 plate). — B. D. Halsted, 'Crazy pollen of *Uvularia*.'

Bot. Centralblatt. (Nos. 28–30). — S. Gheorgieff, 'Beitrag zur vergleichenden Anatomie der Chenopodiaceen.'—V. Chmielewsky, 'Zur Frage über die feinere Structur der Chlorophyllkörner' (1 plate).—Id., 'Über die von Molisch beschreibenen Proteïnkörper in den Zweigen von Epiphyllum.'

Bot. Zeitung (June 24; July 1, 8, 15). — T. W. Engelmann, 'Die Farben bunter Laubblätter und ihre Bedeutung für die Zerlegung der Kohlensäure in Lichte' (2 plates). — (July 15). Fischer v. Waldheim, 'Eine weibliche Pyramidenpappel in Warschau.'

Bull. Soc. Bot. France (xxxiv. Comptes-rendus 3: July 1).— E. Blanc & E. Cosson, 'Sur l'Acacia gommifère de Tunisie.'— P. Van Tieghem, 'Le réseau sus-endodermique de la racine des Crucifères.'—J. Vallot, 'Sur quelques plantes de Corse.'— —. Hue, 'Lichens recoltés sur le Mont Blanc.' — P. Van Tieghem & H. Douliot, 'Origine des radicelles et des racines latérales dans les

Rubiacées, &c.' — Leclerc du Sablon, 'Observations anatomiques sur la structure et le développement des suçoirs du *Melampyrum pratense*.'— —. Prilliex, 'Taches produites sur les jeunes feuilles de *Cyclamen*.'—E. Gadeceau, 'Description d'un Orchis hybride inedit' (*Orchis alatoides* Gadec.). — P. Maury, 'Note sur l'ascide du *Cephalotus follicularis*.'

Bull. Torrey Bot. Club (July). — G. Vasey, '*Redfieldia*, a new genus of Grasses' (1 plate). — S. H. Wright, 'A new genus in *Cyperaceæ*' (*Websteria*). — E. L. Greene, Bibliographical notes on *Linnæa borealis*. — A. F. Foerste, 'Morphological notes on *Caulophyllum thalictroides*.' — N. L. Britton, 'A supposed new genus of *Anacardiaceæ* from Bolivia' (*Syncocarpus*). — W. E. Safford, 'Flora of Banda Oriental.'

Gardeners' Chronicle (July 2). — *Masdevallia demissa* Rchb. f., sp. n.—W. B. Hemsley, 'The Botanical Magazine.'—H. G. Reichenbach, 'A prolified *Cattleya*' (fig. 3). — (July 9). *Schomburgkia Thomsoniana* Rchb. f., sp. n.; *Notylia Bungerothii* Rchb. f., sp. n.— (July 16). *Cirrhopetalum Lendyanum* Rchb. f., n. sp. — (July 23). *Dendrobium aurantiacum* Rchb. f., *Selaginella diminutifolia* Jenman, *S. dendricola* Jenman, spp. nn.—Hybrid *Lychnis* (*L. Flos-jovis* × *L. Coronaria*) (figs. 22–24).—Hybrid *Tacsonia* (fig. 26).

Journal de Botanique (July 1). — G. Colomb, 'Sur la vrille des Cucurbitacées.' — P. Brunand, 'Espèces et variétés nouvelles de Sphæropsidées trouvés aux environs de Saintes' (many new species). — (July 15). J. Vallot, 'Sur une période chaude survenue entre l'époque glaciaire et l'epoque actuelle.' — N. Patouillard, 'Notes sur quelques Champignons' (*Ganoderma neglectum*, *Schizophyllum fasciatum*, *S. mexicanum*, spp. nn.).

Journ. Linn. Soc. (Botany, xxii., No. 149: June 30. — J. G. Baker, 'Further Contributions to the Flora of Madagascar' (*Rhodosepala* (Melastomaceæ Osbeckieæ), *Amphorocalyx* (Melastomaceæ Oxysporeæ), *Gomphocalyx* (Rubiaceæ Spermacocceæ), *Astephanocarpa* (Compositæ Inuloideæ), *Temnolepis* (Compositæ Helianthoideæ), genn. novv.: many new species). — (xxiv., No. 158: June 30). A. Bateson & F. Darwin, 'Effect of Stimulation on turgescent vegetable tissues.' — G. King, 'Observations on Genus *Ficus*.'— G. Massee, 'Disease of *Colocasia* in Jamaica' (*Peronospora trichotoma* Massee, *Heterosporium Colocasiæ* Massee, spp. nn.: 1 plate).— A. W. Bennett, 'Affinities and Classification of Algæ.'

Midland Naturalist (July). — W. Matthews, 'History of the County Botany of Worcester.'—J. E. Bagnall, 'New British Moss' (*Dicranum undulatum*).

Oesterr. Bot. Zeitschrift. (July). — J. Bornmüller, *Rhamnus orbiculata*, n. sp.—Wolosczczak, '*Galium Jarynæ* (*G. Mollugo* × *polonicum*).'— B. Blocki, *Hieracium ciliatum*, n. sp. — Autobiography of R. v. Uechtritz (portrait).

ON CAUSES INFLUENCING THE DIRECTION OF GROWTH, AND THE ORIGIN OF MULTICELLULAR PLANTS.

By George Massee.

(Plate 277.)

In Algæ the presence of a more or less gelatinous membrane exterior to the true cell-wall, and extending continuously over every part of the plant, is not uncommon. In the *Florideæ* such a membrane is universal, as also in most of the green filamentous and unicellular groups. The formation of this membrane is contemporaneous with the development of the cell itself, and I am inclined to believe with Klebs* that the substance of which it is composed is secreted by the protoplasm, and not the result of gelification of the cell-wall; and further, that at first it closely resembles protoplasm in many of its properties, both physical and chemical, becoming blackened with nitrate of silver prepared according to Poulsen's formula;† when placed in water at a temperature of 50° C., shrinkage due to coagulation takes place; alcohol produces a similar effect. If treated with an aqueous solution of iodine in potassic iodide, it becomes yellow-brown; and finally, if treated with nitric acid and afterwards with dilute potassic hydrate, potassic xanthoproteate is formed, which assumes a bright yellow colour, proving the presence of protein substances. The above reactions can only be obtained in cases where rapid apical growth is proceeding, as soon after exudation the substance of the sheath undergoes changes, causing it to be unaffected by reagents, and for this reason the tips of the smaller red sea-weeds, as species of *Callithamnion*, *Ptilota*, and *Polysiphonia*, are preferable to the green filamentous Algæ, as in the latter the terminal cell is not necessarily the youngest, in fact rarely so after the formation of the first three or four cells, further increase of cells being due to interstitial growth and division.

The foregoing observations coincide with Berthold's theory,‡ that in spores, unicellular Algæ, and on free cell-surfaces generally, a film of protoplasm extends over the cell-wall, the latter being considered to exercise a supporting rather than a protective function. In algæ it can be clearly demonstrated that the formation of the *cellulose* cell-wall never precedes that of the mucilaginous sheath; and it is also a fact well known to biologists that in very young cells it is impossible to demonstrate chemically the presence of cellulose, which up to the present has been only assumed to occupy the position which afterwards it can be proved to do; and when this can first be done, it is invariably enveloped in a sheath; in

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* 'Unters. Bot. Inst. Tubingen,' ii. (1886).

† 'Botanical Micro-Chemistry.' American ed., p. 40.

‡ 'Studien über Protoplasmamechanik,' Leipzig, 1886. See also Prof. H. Marshall Ward in 'Nature,' xxxv. (1887).

other words, is preceded in development by a substance closely resembling, if not identical with, protoplasm.

After the appearance of the cell-wall, the sheath at once undergoes physical and chemical changes. It is always at first structureless and homogeneous, and differs from ordinary mucilage in being insoluble in alkalies, cuprammonia, sulphuric acid, and in Schulze's maceration fluid; when treated with the last-mentioned, the sheath may be readily seen after disintegration of the tissues has taken place, which is effected without heat. According to Klebs,* the sheath, when living, is dissolved by Prussian blue; this statement I have not been able to confirm, due probably to the omission of some indispensable factor in connection with manipulation. The sheath usually remains homogeneous, but in the genus *Pandorina* the innermost portion consists of parallel rods placed end on to the wall of the cell; and in some of the larger species of *Cladophora*, as *C. crispata* Kutzg., the rods run parallel to the surface of the cell-wall. The portion consisting of rods stains readily with methyl-violet and other aniline dyes; the homogeneous portion does not stain.

It is due to the viscidity of this membrane that Algæ adhere so firmly to paper when dried, more especially the youngest portions, as in most species the viscidity disappears as the membrane becomes older. If growing points of the more delicate species are placed on the slide in sea-water, and desiccation guarded against, they will continue to grow for some time; and it will be observed, more especially in species of *Polysiphonia*, that the surface of the sheath —by which is meant, when speaking of the apical cell, the external part of the protoplasm—is in some instances more or less papillose, and not unfrequently a papilla may be seen to extend itself into an exceedingly fine cilium varying in length from 5 to 100 μ, and less than 1 μ in thickness. These cilia are plastic and flexible, as can be proved by absorbing the water by means of a piece of blotting-paper, when they will be seen to move with the current; but I have not observed any movements that could be designated as spontaneous. With iodine they stain like the sheath, and contract under the influence of heat or alcohol. The uncertainty attending the development of these cilia leads to the belief that they are of but slight importance to the plant, yet in *Polysiphonia fibrillosa* Grev. they are almost invariably present at the extreme tip, and retract before the sheath undergoes change; and are not to be confounded with somewhat similar but larger *cells*, ususally septate, and very numerous on the young shoots.

Some time ago, in describing the structure of the subterranean leaves of *Lathræa squamaria* L.,† I observed on the surface of some of the large stipitate glands numerous fine cilia, which I described as outgrowths of the cell-wall. Since the publication of the above these cilia have been described by Kernier and Wettstein‡ as

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* *Tom. cit.*

† 'On the Structure and Functions of the Subterranean Parts of *Lathræa squamaria* L.,' Journ. Bot. Sept. 1886).

‡ 'S. B. K. Akad. Wiss. Wien,' xciii. (1886).

protoplasmic threads protruding through distinct perforations in the cell-wall, for the purpose of absorbing nitrogenous matter from Infusoria and mites which have perished in the cavity of the leaf. During the present season I have again paid attention to this point, and am convinced that the cilia are extensions of a sheath external to the cell-wall, which behaves with reagents in a similar manner to the algal sheath.

The structures described as pits in the cell-wall are minute elevations of the sheath from which the cilia extend; perforations do not exist in the cell-wall. When young the glands in *Lathræa* are viscid, as shown by the adhesion to their surface of minute particles that have been carried by water into the cavity of the leaf. Not unfrequently the surface of old portions of the sheath in algæ, instead of presenting the usual even surface, is seen to be covered with minute elevations in the form of warts or irregular wavy lines, evidently due to unequal contraction of the substance of the sheath. This accidental ornamentation is suggestive as to the origin of spines and warts on the surface of spores and pollen-grains, which are always smooth at first, and covered with a sheath exterior to the true cell-wall. The thick, coloured, warted or spinulose covering of resting-spores in Algæ and Fungi originates in a similar manner, a fact which has already been recorded by Reinsch* for the resting-spores in the genus *Acanthococcus*.

In addition to the formation of the external cuticularised sheath, a second function is performed by the substance exuded from cells in the interior of the thallus. In such genera as *Caulocanthus*, *Gloiosiphonia*, *Calosiphonia*, and *Halymenia*, the axis consists of one or more rows of large superposed cells, giving origin at intervals to scattered or whorled branches, which, by repeated bifurcations, form dense even-topped corymbs in contact with each other; the cells, becoming smaller outwards and agglutinated together, form a continuous pseudo-parenchymatous cortex. The resulting structure may be circular in section, as in *Gloiosiphonia*, or compressed, as in *Halymenia*, depending on the relative development of the branches. In the above genera the cementing material soon forms a cuticularised external membrane, but the internal portion continues to give for a much longer period the same reactions as the external sheath during its earliest stage. In the stipes of most Algæ this intercellular material is secreted in such quantity that cells originally in contact become widely separated, the lateral connecting strands of protoplasm being destroyed. In this substance new strings of cells appear as outgrowths from older cells, and push their way through the intercellular plastic material in all directions, often completely effacing the original cell-arrangements. These secondary growths usually remain smaller than the primary cells, and are the cause of irregularity in size of the cells, as seen in a transverse section of old portions of the thallus.

In describing the structure of the *Nostochineæ*, Borzi† remarks

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* 'Ber. Deutsch. Bot. Gesell.' iv. (1886).

† 'Malpighia,' i. (1886), pp. 74—83, 97—108, 145—160, 197—203.

that, contrary to the general statement, a gelatinous outer sheath is present in *Oscillaria*, and the material of which it is composed has been termed *cyanophin* by this author, who considers it to originate from the cell-wall; a statement which at first appears antagonistic to Berthold's theory, but in reality is in accordance with it, inasmuch as it is stated that in *Oscillaria* there is no true cell-wall, but only a differentiated peripheral portion of protoplasm.

The true cause of cuticularisation, or hardening of the sheath, I have not succeeded in ascertaining, but in those species in which the sheath is in direct contact with water or air—not enclosed in a still more external gelatinous mass, as in *Nostoc*—cuticularisation is most complete, and of the two media air is most potent in producing this effect; a statement which applies equally to Phanerogams, as shown by the relative development of the cuticularised epidermis in aërial and submerged portions. As to whether the relative amount of oxygen in air and water is concerned with this differentiation, I have not been able to determine with certainty; but I find that when *Cladophora flavescens* Ag. is grown in water into which oxygen is forced every day, the cells cease to grow in length, and are soon covered with a cuticle so firm as to prevent lateral cell-formation, which normally takes place at the distal end of certain cells. The vitality of the plant does not appear to be much inconvenienced by the excess of oxygen, as in certain cells, which presumably from their position would in a plant growing under normal conditions have produced lateral branches; the distal septum, being surrounded by protoplasm, remains plastic, at first becomes arched, the convexity pointing towards the apex of the filament, and, acting as a new growing point, increases in length, and forms a new cell within the wall of the old anterior cell. It has been shown by Gay* that when the species of *Zygnema* are growing in places from which the water has disappeared, the filaments break up, each portion secreting an excess of mucilage, which soon becomes cuticularised, and in this condition retain their vitality for months. On the return of moisture the mucilage becomes softened. and by cell-division a filament is formed.

In marine Algæ, that range in distribution from high-tide level to low-water mark, the effect of relative exposure to dry air is very apparent. *Fucus vesiculosus* L., when growing in places which are submerged only for a short period during high-tide, is dwarfed to one or two inches in length, and microscopic examination shows the tissue to be composed of very minute cells, increase in size being prevented by the thick, firm, cuticularised sheath. That such dwarfed specimens are mature is proved by the presence of antheridia and oogonia. As this species is followed down to low-water a gradual increase in size is observable, in the last-mentioned locality often exceeding six feet in length, the sheath remains plastic, and the cells many times larger than in the dwarfed forms.

In primordial or naked cells, whether animal or vegetable, one of the peculiarities manifested by the protoplasm is its power of

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* 'Bull. Soc. Bot. France,' vii. (1886), Sess. Extraord. pp. li—lx.

movement and change of shape, as shown by the protrusion of pseudopodia or cilia. That such freedom of movement is due to the absence of a resisting external sheath, and not to any innate specialty of the protoplasm of primordial cells as such, is proved by the fact that when a membrane is present sufficiently firm to resist the outward pressure of the protoplasm, but at the same time furnished with perforations, the protoplasm protrudes through the openings in the form of motile threads, as in the *Foraminifera* and the large zoospores of *Protococcus pluvialis;* and even in the most highly-differentiated plants, where a firm continuous cell-wall is present, movements due to the protrusion and retraction of pseudopodia may be seen to take place in the plexus of protoplasm situated in the sap-cavity. In primordial cells that do not show any marked motility, as the oospheres of *Fucus vesiculosus*, there is yet evidence of the power of movement and change of shape; while in the oogonium these cells are irregularly polygonal from mutual pressure, but on escaping into the water become within a very short time perfect spheres; whereas in the genus *Sphagnum* the four daughter-cells of each spore producing mother-cell remain in contact until after the formation of a firm epispore, and consequently, when liberated, retain the form of a pyramid with a convex base. In *Enteridium olivaceum* Ehr. the spores also remain in groups until after the development of the epispore, the free surface of each spore being warted, whereas the portions that were in contact remain smooth.

In Algæ are included those forms of life which manifest the minimum amount of protoplasmic differentiation, as also the earliest departure from the primitive spherical cell form, and the gradual transition from unicellular to multicellular plants; changes due, I believe, in the first instance to influence exercised by the external sheath, the universal presence of which has for some time been known to biologists. Sachs* alludes to its presence as follows:—"The internal differentiation of protoplasm usually manifests itself by the formation of an external hyaline, firmer, but very thin, layer surrounding the inner mass, with which it remains in the most intimate contact. Every portion of a protoplasm-mass immediately surrounds itself, when it becomes isolated, with such a skin." In Algæ the cell-wall appears in the middle of this skin, the inner portion being afterwards known as the cytioplasm; the external part forms the sheath, which in most instances is added to by subsequent secretion from the protoplasm.

During the vegetative period protoplasm adds to its bulk by the assimilation of foreign matter, and in primitive types, where life manifests but little individuality, extends along the lines of least resistance, or passively obeys the directive influence of the more potent surplus of chemical and physical forces, which are antagonistic to the same forces manifesting themselves as life through protoplasm; hence in the *Chroococcaceæ*, which from both vegetative and reproductive standpoint may be considered as including

* 'Text-book of Botany,' 2nd English ed. p. 38.

the pioneers of plant-life, spherical cells predominate, due to the equal extensibility of the sheath, which is the only factor of importance in determining the direction of growth in the simplest plants. As we pass upwards in the developmental scale of algal life, it will be shown that other factors also play a part in determining the mode of cell-growth and branching, due to increased potentiality of protoplasm in effecting differentiation and rearrangement of its own substance.

In unicellular Algæ the tendency to form colonies is due to the copious secretion of mucilage, which is external to, and quite distinct from, the sheath. One of the functions of this mucilage is that of preventing desiccation, and is the most primitive arrangement by which plants were enabled to extend their area of distribution from their primordial aquatic home, and encroach by degrees on land surfaces, as illustrated by *Nostoc*. In the British *Palmellaceæ*, six of the rarer species, included under four genera, are solitary, or in very small groups, and remain aquatic; whereas four genera, forming gelatinous colonies, include twenty-one species, most of which are widely distributed on damp surfaces. This primitive method of guarding against desiccation, when plants are exposed to dry air, was early superseded by differentiation and cuticularisation of the external sheath; nevertheless it is interesting to note that in the *Hepaticæ*, which may be considered as forming the transition from primitive aquatic to terrestrial vegetation, the secretion of mucus is in some species very copious. Dr. Spruce,* in describing the genus *Anomoclada*, belong to the *Hepaticæ*, after noting some peculiarities of structure, says:—"But, above all, in the patches being always suffused with mucilage, which I at first took for an extraneous and probably tremelloid growth, but finding it constantly present, not only in that locality, but in many others, ... I was forced to the conclusion that the mucus exuded from the plant itself."

Respecting the origin of the secretion, the author says:—"I saw plainly that the mucus, which was poured out in such quantity as literally to flood the entire plant, was derived directly from the stipules, whose marginal and apical cells were continually swelling and discharging their protoplasm, adhering for a while as empty bleached bladders ($\frac{1}{30}$ mm. in diameter), then falling away, for the succeeding cells to undergo the same process." Other species of *Hepaticæ* are also referred to as secreting mucus, which is shown to be derived from the protoplasm. It is interesting to find that the above statement as to the protoplasmic origin of mucus, which was written eleven years ago, has been corroborated by the later researches of Klebs, as mentioned above, also by Gardiner and Ito.†

Plants remain unicellular so long as the tendency of the protoplasm to resolve itself into a sphere, after cell-division, predominates

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* 'On *Anomoclada*, a new genus of *Hepaticæ*,' Journ. Bot. 1876.

† 'On the Structure of the Mucilage-cells of *Blechnum occidentale* L. and *Osmunda regalis* L.' Read before the Royal Society, June 16th, 1887.

over external forces, which in the simpler Algæ is reduced to the resistance offered by the external sheath. These conditions predominate in the *Chroococcaceæ*, but are also met with in Phanerogams where cells are free from the pressure of surrounding tissues, as in some pollen-grains.

Differentiation of the sheath is observable at a very early period of plant evolution, as in the *Oscillariaceæ*, where its cuticularisation, except at one point, exerts a directive influence on the extension of the protoplasm and subsequent cell-formation, which is continued in a straight line away from the starting-point, owing to the rapid hardening of the sheath behind the growing-point, producing at the same time a multicellular plant, progressive differentiation predominating over the initial tendency of protoplasm to separate after cell-division and form isolated individuals. In such genera the tip of the filament, where the sheath is sufficiently plastic to yield to the pressure of increasing material, constitutes a growing-point so long as the assimilative power of the protoplasm continues. In the genus *Oscillaria* the otherwise rigid filaments are more or less directed from a straight line, and describe helicoid curves at the apex, due to rapid physical and chemical changes taking place in the youngest portion of the sheath during differentiation. Such movements are most pronounced in species growing in shallow water or damp places, and consequently exposed to the influence of the atmosphere.

The cap-like structure described by Borzi* as covering the growing-point in *Oscillaria* is in reality the relatively thick undifferentiated portion of the sheath, which contracts as it becomes cuticularised. The individuality of the sheath, and its importance in exercising a directive influence on growth is very clearly illustrated by such genera as *Microchæte*, *Lyngbya*, *Rivularia*, and *Calothrix*, where, as in *Oscillaria*, the individual consists of an unbranched single row of superposed cells, enclosed in a firm sheath.

After the completion of the vegetative period, reproduction commences by the formation of hormogonia; in those species with heterocysts the string of cells between two of the latter constitutes a hormogonium; in the absence of heterocysts constrictions take place at intervals, the portions becoming detached, and soon escape through the ruptured apex of the sheath into the surrounding water, where, as first pointed out by Bornet and Thuret,† they exhibit the power of movement, until retarded by the development of the sheath, which, according to the above authors, is secreted within twenty-four hours in species of *Lyngbya*.‡ The number of cells forming a homogonium varies with the species, from six to twenty or more, and, after the secretion of a sheath, becomes attached by one end and increases in length by cell-division at the apex. It is interesting to notice that the direction of the axis of growth of the parent plant is retained in the development of individuals from hormogonia, which is not in harmony with the state-

* *Loc. cit.* † 'Notes Algologiques,' fasc. i. p. vi. ‡ *L. c.* p. 4.

ment of Sachs* in this matter. In the above genera all the cells are not transformed into hormogonia; but a few remain at the base of the sheath, the uppermost of which acts as a new growing-point, and by cell-division gives origin to a second string of cells included within the old empty sheath of the first generation. A similar sheath is secreted round the second growth of cells, which in due time, like the first, change into hormogonia and escape, to be followed by a third development of cells within the two empty sheaths. This peculiar mode of growth is repeated many times, and as each string of cells is somewhat longer than the one that preceded it, a telescopic arrangement of empty sheaths may be seen at the end of the season. Ten such sheaths are figured by Bornet and Thuret† in *Calothrix æruginea* Thur., and an indefinite number in *Isactis plana* Thur.

The peculiar secondary development of cells described above is evidently due to the power possessed by the uppermost cell of those remaining at the base of the sheath, in virtue of its undifferentiated anterior wall—originally a transverse septum—of yielding to the pressure of the increasing volume of protoplasm, and thus constituting a growing-point, from which cells are cut off by transverse septa; whereas the direction taken by the growing filament, even if it did not secrete a sheath of its own, would obviously be determined by the presence of the previously existing sheath: thus it is seen that the power possessed by *Cladophora flavescens*, as already described, of extemporising a growing-point from a still plastic internal transverse septum, when placed under exceptional conditions, is the normal method in other genera. I have observed a similar method of branch-formation in *Ectocarpus tomentosus* Ag., where, after escape of the contents of a plurilocular sporangium, the transverse wall at the base protruded into the empty sporangium and formed an ordinary branch. Schmitz‡ describes a similar development as follows:—"Very frequently, however, after the evacuation of a spermatium-mother-cell, its supporting cell grows through it and developes, within the empty envelope of the spermatium-mother-cell, a new male cell (*Batrachospermum*, *Chantransia*), until the contained masses of the supporting cell are used up."

In the genus *Œdogonium* a very remarkable mode of cell-development is met with, resulting from cuticularisation of the sheath being almost simultaneous with its secretion. The spore, after attaching itself to some object by means of a disc formed of exuded matter, increases in length until it is from three to four times as long as broad, when it is divided into two cells by the formation of a transverse septum; rarely the apical cell, after increasing in length, divides again in a similar manner. The next change consists in the aggregation of the protoplasm at the distal end of each cell, followed by the appearance of a thickening of the wall in the form of a ring projecting into the cell. The ring is at

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* 'Text-book of Botany,' English ed. p. 9. † *Loc. cit.* pl. xi. & xxxvi.

‡ Prof. F. Schmitz, 'On the Fertilisation of the *Florideæ*.' Transl. in Ann. & Mag. Nat. Hist., Jan. 1884.

first about 2 μ wide, but soon increases to 8–10 μ, at the same time projecting further into the cavity of the cell. When young the ring appears solid, but as growth proceeds the cautious application of Schulze's macerating fluid causes it to separate from the external sheath, when it appears as an infolding of the cell-wall, which has been prevented from extending in a straight line, and compelled to fold inwards, by the inelastic sheath. When the wing reaches a width of from 8–10 μ, the tension of the sheath is overcome, and it is split in a circumscissile manner in a line following the centre of the infolded ring, which now rapidly elongates and forms a new cell, a transverse septum appearing at the basal end, cutting it off from the cell below, from which it was derived. The cell-wall, when first exposed by rupture of the sheath, does not give a cellulose reaction, but is almost immediately surrounded by an external coat of gelatinous matter, which extends beyond the limits of the older cells, is hyaline and homogeneous, and behaves with reagents in a similar manner to the protoplasm in the cell. Within a short time this substance contracts and forms a thin firm membrane. In contracting, the new membrane does not join on to the two edges of the split membrane, which remain free and project from the surface like the pleats on a lady's dress, one situated at each end of the new cell, and pointing respectively towards the base and apex of the plant and towards each other. After the new cell, which may be termed a generating-cell, is fully formed, aggregation of protoplasm takes place at its distal end, followed by an ingrowth of the wall in the form of a ring, which is situated a little below the position occupied by the first one, and eventually a second cell is formed after the manner of the first, the apex of the generating-cell being now furnished with two pleats. A repetition of this takes place until from five to eight or more cells are formed, the exact number being determined by the number of pleats or free sheath margins forming the so-called cap of the generating-cell.

Although, at first, the above method of cell-formation appears to be without a parallel, it is in reality but a special form of apical growth. In ordinary cases, the apical cell continues to increase in length for some time, when a segment is cut off, which owing to the extensibility of the sheath goes on increasing in size: in other words, cell-growth is progressive, whereas in *Œdogonium*, on account of the rigid sheath, progressive extension is prevented, material for the formation of a new cell accumulates, and its development is simultaneous. In ordinary cases there is but one generating-cell from which daughter-cells are segmented in succession, and known as the apical-cell, but in *Œdogonium* there are from the first two generating-cells, and, as each daughter-cell may in turn become a generating-cell, the number is unlimited. It may be argued that with the exception of the apical-cell, increase in *Œdogonium* is due to interstitial cell-division; but although interstitially placed, the mode of segmentation from the same cell several times in succession resembles in every respect what takes place at the growing-point in other cases, and differs widely from

ordinary interstitial cell-formation. It has been shown by Klebs* that when *Zygnema* and *Œdogonium* are plasmolyzed in 10 per cent. glucose they are not killed but continue to grow and form new cells. In *Zygnema* the walls become thicker and greatly increase in length, and develop in a very irregular and abnormal manner. In *Œdogonium* the cells also increase in thickness and become laminated, and do not divide in the usual characteristic manner, but as in *Cladophora*. It is further stated that these changes take place only in cane, grape, or milk sugar, or mannite; exposure to light is also necessary.

In repeating the above experiments, using cane sugar, I find that both the sheath and cell-wall become swollen and sharply differentiated from each other, which accounts for both increase in thickness and lamination, as also for the very irregular form of cells developed under such abnormal conditions; the normal directive influence of the sheath due to its rigidity being neutralised when swollen, and thus rendered flaccid, consequently the increasing protoplasm extends at random.

The above experiments I consider to prove conclusively that the normal method of cell-formation in *Œdogonium* is due, as stated above, to the unyielding nature of the external sheath. It is not to be understood that the influence of the sheath is considered as the only factor in determining the direction of growth or habit of a plant, but rather that the initial idea of direction and multicellular structure were due to it, and in the simplest as also the unbranched filamentous forms, its influence predominated, but in the latter is modified by the increased power manifested by the protoplasm in softening or completely dissolving certain portions of the sheath for various purposes connected with reproduction, as seen in the beak of the oogonium in the genus *Vaucheria*, and also in *Spirogyra*, where the anterior portion of conjugating cells is dissolved; in interstitial cell-formation; and finally, in the development of lateral outgrowths or branches, the protoplasm bulging outwards and forming a new growing-point at those points of the cell where the sheath has been rendered pliant by the action of the protoplasm.

DESCRIPTION OF PLATE 277.—Fig. 1. *Œdogonium giganteum* Kutz. The numbers 1—6 correspond to the number of pleats forming the "cap" of the generative-cell; the pleats 1′—6′ corresponding to 1—6 respectively, consequently cell-formation is acropetal; *a*, apical, *b*, basal end of filament. ×300. 2. Diagrammatic section of *Œ. giganteum*, showing the thickening *c* to be due to an incurving of the cell-wall *b*, which is prevented from extending by the rigid sheath *a*; *d*, pleat due to rupture of sheath during formation of a previous cell. 3. Diagrammatic section of *Œ. giganteum*, showing the process of cell-formation after rupture of the sheath *a*, which has formed two pleats, *d*, *e*, facing each other; *b*, cell-wall which is extending at *c* to form a new cell; *f*, hyaline mucilaginous sheath secreted from the new cell-wall, after rupture of the sheath. 4. *Isactis plana* Thur., showing telescopic arrangement of sheaths 1—7, each corresponding to one vegetative and reproductive phase of the plant's life; 7, basal permanent portion of cells, which by apical increase and interstitial division produces a new filament. × 300. 5. *Ectocarpus tomentosus* Lyngb., showing formation of a vegetative branch, 2, due to extension of a

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* SB. Versamml. Deutsch. Naturf. u. Aerzte, Sept. 22, 1886.

transverse septum, 3, through an empty plurilocular sporangium, 1. × 300. 6. *Polysiphonia fastigiata* Grev., showing fine filiform processes springing from the sheath at the growing-point. × 500. 7. *Oscillaria subfusca* Vauch., with filiform processes at the growing-point, which are charcteristic of this species. × 500. 8. *Cladophora flavescens* Kutz., showing formation of one cell within another, owing to a transverse septum acting as a growing-point, when grown in oxygenated water. × 300. *Oscillaria Frolichii* Kutz., from the warm tank, Kew Gardens. showing the sheath, 1, after treatment with alcohol. × 500. 10. *O. Frolichii.* A single hormogonium after escaping from the sheath and treatment with potassic hydrate, showing the differentiated protoplasm forming the cell-wall.

ELEOCHARIS R. Br.

Species in Europa vigentes recensuit C. B. Clarke.

Subgenus 1. Eleogenus.—Stylus bifidus (in *E. orata* raro trifidus). — Genus *Eleogenus* Nees in Wight Contrib. p. 112. — Genus *Heleocharis* Lestib. Essai Cyp. p. 41.

[In sp. Europæis nux levis aut obscurius reticulata: cellulæ extimæ quadrato-rotundæ aut longitudinaliter oblongæ non conspicuæ.]

Sect. 1.—Stoloniferæ, perennes.

1. E. palustris R. Br. Prod. p. 224 in adn.; nuce brunneâ, olivaceâ aut castaneâ; Th. Nees, Gen. Fl. Germ. Monocot. v. 2, t. 18, fig. 1–16; Leighton, Fl. Shrop. p. 33, t. 2; Nyman, Consp. Fl. Europ. p. 767. *E. uniglumis* Schultes in Roem. et Sch. Syst. Mant. 2, p. 88; Nyman, Consp. Fl. Europ. p. 767. *E. affinis* C. A. Meyer!; Steud. Cyp. p. 77. *E. Nebrodensis* Parl.! Fl. Ital. v. 2, p. 63; Nyman, Consp. Fl. Europ. p. 767. *E. multicaulis* Hook.! Fl. Bor.-Amer. v. 2, p. 228 (et hh. plur. partim). *Scirpus palustris* L. Sp. Pl. p. 70, et h. propr. partim; Fl. Dan. t. 273; Host, Gram. v. 3, p. 38, t. 55; Lam. Ill. v. 1, p. 138, t. 38, fig. 1; Leers. Fl. Herbor. p. 10, t. 1, fig. 3; Sowerby, Engl. Bot. t. 131; Sturm, Fl. v. 3, t. 9; Reich. Ic. Fl. Germ. v. 8, p. 38, t. 297, fig. 704; Anders. Cyp. Scand. p. 10, t. 2, fig. 22. *S. uniglumis* Link, Jahrb. v. 3, p. 77; Sturm, Fl. heft. 78 (tab.); Reich. Ic. Crit. v. 2, p. 182, nuce excl., et Ic. Fl. Germ. v. 8, p. 37, t. 296, fig. 703; Anders. Cyp. Scand. p. 10, t. 2, fig. 23; Syme, Engl. Bot. v. 10, p. 52, t. 1587. *S. glaucescens* Mérat, Fl. Paris (ed. 2), v. 2, p. 444, non Willd. *S. reptans* Thuill.! Fl. Paris, p. 22. *S. intermedius* Thuill.! Fl. Paris, p. 21, non Poir. *S. acicularis* Fl. Dan. t. 167. *S. varius* et *S. tenuis* Schweigge et Koerte, Fl. Erlangen, pp. 11, 12, 159. *Bulbostylis palustris* Stev. in Mem. Soc. Nat. Cur. Mosc. v. 5, p. 355. *Elæocharis palustris* et *E. uniglumis* Ledeb. Fl. Ross. v. 4, pp. 244, 245. *Heleocharis palustris* Lindl. Syn. Brit. Fl. p. 280; Boeck. in Linnæa, v. 36, p. 466 partim (*i. e.*, exemplis tristigmaticis excl.). *H. uniglumis* Reich. Fl. Germ. Excurs. p. 77. *H. crassa* C. A. Meyer MS.; Boeck. in Flora, 1858, p. 413, in obs. *H. conica* Presl, fide Schur. Pl. Transsilv. p. 690. *Clavula palustris* et *C. uniglumis* Dumort. Fl. Belg. p. 143.

Per totam Europam.

Distrib. Per totam fere orbem terrarum, nisi in planitie tropica; in Australia ignota (nisi *E. Dietrichiana* Boeck. pro varietate habenda est), in Patagonia ignota (nisi *E. macrorrhiza* Boeck. pro varietate habenda est).

Var. β. *Watsoni* (sp.) C. C. Bab.! in Ann. Nat. Hist. Ser. 2, v. 10 (1852), pp. 19–21; depauperata; culmis 6–10 cm. longis, tenuibus, spicis 5–7 mm. longis, castaneis. *? Elæocharis filicuimis* Schur, Pl. Transsilv. p. 690.

Scotia; in ora Argyle, *C. C. Babington.*

Distrib. Newfoundland, Labrador, America Subarctica.

2. E. CADUCA Schultes in Roem. et Sch. Syst. Mant. 2, p. 88; nuce atrâ; Kunth, Enum. v. 2, p. 151; Steud. Cyp. p. 79. *Scirpus caducus* Delile! Ægypt. p. 9, t. 6, fig. 2. *Heleocharis caduca* Boiss. Fl. Orient. v. 5, p. 388. *H. capitata* Boeck. in Linnæa, v. 36, p. 462 (quoad plantam Sardonicam). *H. ovata* Barbey, Fl. Sardoæ, p. 63. — (An huc partim *Scirpus palustris* Gussone, Prod. Fl. Sicil. v. 1, p. 47, et Fl. Sicul. Syn. v. 1, p. 49 ?).

Stolones longi 1 dm., tenues, pallidi. Culmi 5–8 cm. longi, teretes, striatuli, subspongiosi; vagina summa in altero latere producta triangularis aut fere lanceolata. Spica 5 mm. longa, ovoidea, densa. Glumæ in dorso anguste virides, in lateribus spadiceæ, in margine scariosæ; ima paullo major, in dorso late viridis, subbracteæformis. Setæ 5–6, nucem paullo superantes, retrorsim scabræ, ferrugineo-rubræ. Nux obovoidea, compressa, apice obtusa; stylobasis depresso-triangularis pallida. — Species ab *E. capitatâ* recedit stolonibus et stylobasi late triangulari: ab *E. palustri* recedit teneritate et nuce aterrimâ apice subito constrictâ.

Sardinia; *U. I. Mueller.*

Distrib. Damietta; *Delile.* Syria; *fide Boissier.*

Sect. 2.—Radices fibrosæ.

3. E. OVATA R. Br. Prod. p. 224, in adn.; nuce stramineâ, brunnescente; stylobasi late triangulari, submitratâ. Th. Nees, Gen. Fl. Germ. Monocot. v. 2, t. 18, fig. 17–20; Nyman, Consp. Fl. Europ. p. 766 (pl. Sardonica excl.). *E. obtusa* Schultes in Roem. et Sch. Syst. Mant. 2, p. 89. *Scirpus ovatus* Roth, Catalect. v. 1, p. 5; Fl. Dan. t. 372; Host, Gram. v. 3, t. 56; Reich. Ic. Fl. Germ. v. 8, p. 37, t. 295, figg. 700, 701; Anders. Cyp. Scand. p. 11, t. 2, fig. 25. *S. obtusus* Willd. Enum. H. Berol. p. 76 (stylo trifido). *S. capitatus* L.! Sp. Pl. p. 70 (saltem pro magna parte) et h. propr. partim. *S. compressus* Mœnch. Method. p. 349. *S. annuus* Thuill! Fl. Paris, p. 22. *S. turgidus* Pers. Syn. v. i. p. 66. *S. multicaulis* Gmel. Fl. Badens. v. 1, p. 96. *S. Soloniensis* Dubois, Method. p. 249. *S. nutans* Bergeret, Fl. Pyren. v. 1, p. 43. *Bulbostylis ovata* Steven in Mem. Soc. Imp. Nat. Mosc. v. 5 (1813), p. 355. *Elæocharis ovata* Ledeb. Fl. Ross. v. 4, p. 245. *Eleogenus ovatus* Nees in Linnæa, v. 9, p. 294. *Heleocharis ovata* Reich. Fl. Germ. Excurs. p. 77; Boeck. in Flora, 1860, p. 2, et in Linnæa, v. 36, p. 462. *Clavula ovata* Dumort. Fl. Belg. p. 143.

Europa Centralis; a Gallia (La Vendée, Pyrenees, Alsace)

usque ad Rossiam Mediam, Italiam. Borealem, Hungariam et Caucasum.

Distrib. America Borealis, fere tota, cum India Occidentali, et Ins. Sandwich. In Asia rara: Troy (h. Calcutta!); Iberia (*fide* Boissieri qui non viderat); Amurland, *Maximowicz*!; Java, *Zollinger*!; India, *Wallich*, n. 3487 in h. Kew partim (an revera in India lecta?).

4. E. CARNIOLICA Koch, sub *Heleocharide;* nuce olivaceâ; stylobasi anguste conicâ, fuscâ. Parl. Fl. Ital. v. 2, p. 66; Nyman Consp. Fl. Europ. p. 767. *E. Bartoliniana* De Notar. Ind. Sem. H. Genev. 1848, p. 24; Steud. Cyp. p. 80. *Scirpus gracilis* Salzm.; Reich. Ic. Fl. Germ. v. 8, p. 37, t. 294, fig. 698. *Heleocharis Carniolica* Koch, Syn. Fl. Germ. (ed. 2), p. 863; Boeck. in Linnæa, v. 36, p. 435. *Elæocharis Carniolica* Schur. Pl. Transsilv. p. 691.

Ab Italia boreali usque ad Hungariam (Pedemonta, Styria, Croatia, Carniola, Dalmatia).

5. E. ATROPURPUREA Kunth, Enum. v. 2 (1837), p. 151; nuce atrâ; stylobasi parvâ, albâ. J. Gay! in Flora, 1842, p. 641 (locus class.). *E. Lereschii* Steud. Cyp. p. 80; Nyman, Consp. Fl. Europ. p. 766. *E. ? erratica* Steud. Cyp. p. 79. *Z. Lanardinii* Parl. Fl. Ital. v. 2, p. 67, e descr.; Nyman, Consp. Fl. Europ. p. 767. *Scirpus atropurpureus* Retz, Obs. v. 5, p. 14; Reich. Ic. Fl. Germ. v. 8, p. 37, t. 295, fig. 699. *S. Lereschii* Thomas! Cat. Pl. Suiss. p. 44. *S. erraticus* Rota!; De Notar. in Linnæa, v. 19 (1845), p. 398, et in Ann. Sc. Nat. Ser. 3, v. 5, p. 366. *Isolepis atropurpurea* Roem. et Sch. Syst. v. 2, p. 106. *Eleogiton atropurpurea* Dietr. Sp. Pl. v. 2, p. 97. *Eleogenus atropurpureus* Nees in Wight Contrib. p. 113. *Elæocharis atropurpurea* Schur, Pl. Transsilv. p. 691. *Heleocharis Lereschii* Shuttleworth in Flora, 1837, p. 241. *H. atropurpurea* Koch, Syn. Fl. Germ. (ed. 2), p. 853; Boeck. in Linnæa, v. 36, p. 458. Var. γ. (*Scirpi* sp.) excl.; Benth.! Fl. Austral. v. 7, p. 296, partim.

Lausanne; aux Pierettes (*Reichenbach*, n. 1611; *Billot*, n. 2752; *Muret*, n. 13). Pavia et Ager Ticinus (*Rota*, *&c.*).

Distrib. Africa Tropica cum Mauritio. Asia; India Orientalis a Cabul usque ad Zeylaniam vulgaris; Macao, *Lay*. Australia Tropica. America Tropica cum Florida et Neo-Mexico.

[Si nomen genericum *Eleocharidem* retineas, nomen specificum "*atropurpurea*" certe accipiendum est: nomen enim *Eleocharis Lereschii* Shuttlew. non est nomine *E. atropurpurea* vetustius. Si autem nomen generis *Heleocharidem* scribas, nomen specificum *Heleocharis Lereschii* conservari potest, quamvis nomen (mihi) *Heleocharis atropurpurea* anteponendum est.]

Subgenus 2. EUELEOCHARIS. — Stylus trifidus. Genus *Limnochloa* Lestib. Essai Cyp. p. 41, non Nees.

Sect. 1. *Aciculares.*—Nucis cellulæ extimæ transversim oblongæ, per series verticales regulariter superimpositæ: nux ideo videtur longitudinaliter costata inter costas arcte horizontaliter trabeculata. —Genus *Scirpidium* Nees in Linnæa, v. 9, p. 293, nec Nees in Mart. Brasil. Cyp. p. 97.

6. E. ACICULARIS R. Br. Prod. p. 224 in adn.; culmis c. 5–10 cm. longis, capillaribus; spicis 3–6 mm. longis. Nyman, Consp. Fl. Europ. p. 767. *E. costata* Presl, Fl. Cech. p. 11. *Scirpus acicularis* L. Sp. Pl. p. 71 partim (syn. Scheuz. excl.), nec Linn. h. propr.; Fl. Dan. v. 2, t. 287; Sturm, Fl. Deutsch. v. 3, Sect. 1, t. 10; Svensk, Bot. t. 605; Curt. Fl. Lond. v. 4, t. 49; Sowerby, Engl. Bot. t. 749; Host, Gram. Austr. v. 3, t. 60; Reich. Ic. Fl. Germ. t. 294, figg. 695, 696, 697; Anders. Cyp. Scand. p. 11, t. 2, fig. 26. *Cyperus acicularis* Wither. Brit. Fl. (ed. 3), v. 2. p. 78. *Eleogiton exiguus* Dietr. Sp. Pl. v. 2, p. 98. *Elæocharis acicularis* Ledeb. Fl. Ross. v. 4, p. 243. *Isolepis acicularis* Schlecht. Pl. Berol. v. 1, p. 36. *Scirpidium aciculare* Nees in Linnæa, v. 9, p. 293; Th. Nees, Gen. Pl. Fl. Germ. Monocot. v. 2, t. 19; Leighton, Fl. Shrop. p. 34, t. 3. *Limnochloa acicularis* Reich. Fl. Germ. Excurs. p. 78. *Chætocyperus acicularis* Nees in Mart. Brasil. Cyp. p. 95 in nota. *Clavula acicularis* Dumort. Fl. Belg. p. 143.

Europa; fere tota ab Islandiâ et Russiâ subarcticâ usque ad Siciliam: exempla autem neque ab Hispania neque ab Græcia a me visa sunt.

Distrib. Asia borealis et media usque ad Japonian, Chinam et Ins. Loochoo (in Indiâ nondum lecta). America fere tota, a Canada et flum. Columbia usque ad Chili sat vulgaris.

Var. *β. longicaulis* H. Watson MS.; culmis 3 dm. longis; spicis; 7 mm. longis, atropurpureis. *Scirpus filiformis* Sauter?; Schur, Pl. Transsilv. p. 691.

Anglia; Yorkshire, Hebden Bridge, *S. Gibson* (hh. Kew, H. Watson, Mus. Brit.).

Distrib. ?

Sectio "Aciculares" a cæteris speciebus *Heleocharidis* facillime distinguuntur; sed inter se nisi magnitudine vix differunt. *Heleocharis striatula* Desv. (in Cl. Gay Chile, v. 6, p. 173, t. 71, fig. 3) est = *H. acicularis* var. *elongata* Benth. (Fl. Austral. v. 7, p. 297); species in Australiâ, et in Americâ late, lecta; quomodo ab *E. acicularis* var. *longicauli* distingui potest?

7. E. AMPHIBIA Durieu! sub *Helæocharide*; culmis c. 4–8 dm. longis; spicis c. 8 mm. longis. *Helæocharis amphibia* Durieu in Act. Soc. Linn. Bordeaux, v. 21 (1858), p. 487, t. 2. *Heleocharis oxyoneura* Durieu; Bull. Soc. Bot. France, v. 2 (1859), p. 609. *H. amphibia* Boeck. in Flora, 1878, p. 33.

Rhizoma longum, tenue, lentum. Culmi tenues, 3–4-angulati; vagina summa tenuiter membranacea, in altero latere ovato-triangularis. Spicæ cylindricæ, densiores, pallide fusce-spadiceæ. Glumæ ovatæ, in dorso luteo-virides, in lateribus fusce rubræ, in margine angustissime scariosæ; ima vacua, paullo brevior, tenuis, vix bracteiformis. Setæ 3, cum nuce subæquilongæ aut obsoletæ, retrorsim scabræ pallidæ. Nux (omnino ut *E. acicularis*) cum ½ parte glumæ æquilonga, lanceolato-obovoidea, sub-polyhedro-teres, apice angustata, straminea, a costis 12 longitudinaliter striata et inter costas arcte horizontaliter trabeculata; stylo-basis parva, conica, fusca, nucis apice latior.

Bordeaux: in "Landes" et in æstuariis fluminis Garonne (*F.*

Schultz, cent. 4, n. 367; *Billot*, n. 2753; *Motelay*, Rel. Mailleanæ, n. 19; *Urgel; Fournier*).

Sect. 2. *Multicaules*. — Nucis cellulæ extimæ quadrato-rotundæ aut longitudinaliter oblongæ; nux ideo videtur levis aut obscure reticulata (in speciebus non Europæis sæpe grossius reticulata.

8. E. MULTICAULIS Smith, Engl. Fl. v. 1 (1824), p. 64; Dietr. Sp. Pl. v. 2 (1833), p. 76; Nyman, Consp. Fl. Europ. p. 767. *Scirpus multicaulis* Smith, Fl. Brit. v. 1, p. 48; Fl. Dan. t. 1923 (bona); A. St. Hilaire in Desv. Journ. Bot. v. 3 (1814), p. 14, t. 21; Sowerby, Engl. Bot. t. 1187; Reich. Ic. Fl. Germ. v. 8, p. 37, t. 296, fig. 702 (stylo perperam 2-fido); Anders. Cyp. Scand. p. 10, t. 2, fig. 24. *S. palustris* L.! h. propr. partim. *Elæocharis multicaulis* Ledeb. Fl. Ross. v. 4, p. 245. *Heleocharis multicaulis* Lindl. Syn. Brit. Fl. p. 280; Boeck. in Linnæa, v. 36, p. 457, non Benth. Fl. Austral. v. 7, p. 295. *H. palustris* J. Ball! in Journ. Linn. Soc. v. 16, p. 702. *Limnochloa multicaulis* Reich. Fl. Germ. Index, p. 72. *Clavula multicaulis* Dumort. Fl. Belg. p. 143.

A Scotia usque ad Lithuaniam, Transylvaniam, Sardiniam, Lusitaniam. Ins. Orkney; *Syme*. Hibernia; Kerry, *Ridley*. Smoland; *Fries*. Westphalia; *Wirtgen*, nn. 441, 467. Sardinia; *Reverchon*, n. 228. Lusitania; *Welwitsch*, nn. 349, 404.

Distrib. Africa; Tunis (*Cosson*). Morocco (*J. D. Hooker*). Ins. Azoricæ (*Godman*, *Drouet*, *Hunt*, n. 269).

Species Australienses, *Eleocharis acuta* R. Br., *gracilis* R. Br., *Cunninghamii* Boeck., *cylindrostachys* Boeck., inter se arcte nexæ, ab *E. multicauli* parum (sed sat) differunt. Species multicaulis a Kunth, Boeckeler, Nyman aliisque Dietrichis tributa est, jure prioritates novem annorum, Smithii sub *Eleocharide*.

N.B.—In redactione supræ, nomina generica, et nomina specifica Europæa citata sunt, synonymis paucis Europæis (cum tabulis) additis.

Kew, Aug. 13, 1887.

NOTES ON THE BOTANY OF MANITOBA.

By R. Miller Christy, F.L.S.

During the years 1883 and 1884 I had occasion to pay several distinct visits to the rising young Canadian province of Manitoba. Upon each visit I devoted as much time as I was able to spare from other matters to the study of natural history, and, as but little has hitherto been published upon the fauna and flora of the province, I propose now to offer a few remarks upon its botany. My observations upon other branches of natural history, and upon the Province as a whole, have already appeared elsewhere, in the shape of magazine articles, &c. It may be found convenient if I append a list of the same.*

* "Manitoba Described," Wyman & Sons, London, 1885. "Notes on the Birds of Manitoba," 'Zoologist,' 3rd series, vol. ix., p. 121, and 'Canadian Science Monthly,' vol. iii., pp. 89 and 105. "Notes on the Mammals of

It must be distinctly understood that the following remarks are put forward merely as *notes*. My observations indeed were made in but few localities, and covered but a portion of a year only. Consequently it is probable that many common Manitoban plants are not even so much as noticed.

Most of the following notes were made near the town of Carberry, on the main line of the Canadian Pacific Railway, and 105 miles west of Winnipeg, during the months of July, August, September, and October, 1883. I cannot too fully acknowledge the assistance rendered to me by my friend Mr. Ernest E. Thompson,† whose researches into the natural history of Manitoba are well known on the other side of the Atlantic. I cannot do better than repeat a description which I have already given of the locality whence came most of the plants spoken of in the following paragraphs:—Carberry stands at the south end of what is known as the "Big Plain," which is merely a rather unusually large stretch of unbroken prairie. South of the town, and extending almost to the Assiniboine River, lies an extensive range of desolate sand-hills, which are seldom invaded by the foot of man, and are likely long to remain in their primitive condition; they consist merely of wind-formed dunes, with hollows between which are filled with water, and form the home of many a rare bird, plant, and mammal. The sand of which the hills are formed is so pure that it can only support a very scanty covering of grass; and it is to this circumstance that we are indebted for the fact that the sand-hills, unlike the prairies, support a fairly abundant growth of trees, such as spruce, poplar, and oak. Were the grass sufficiently long and dense to "carry fire," the trees would be quickly killed and burned to logs. Through the centre of the range of sand-hills runs Pine Creek, a sluggish stream clogged with water-lilies, and fringed with willows and bulrushes. For several miles on either side of the creek extends a huge swamp, covered thickly with trees of spruce and tamarac, where the Indian pitcher-plant, *Sarracenia purpurea*, grows by the acre, and all things combine to make a true naturalist's paradise. In winter, when everything is frozen hard, this swamp may be crossed with ease; but so wet and impenetrable is it in summer, that I have little hesitation in claiming that no one except Mr. Seton and myself have ever crossed it at that time of year. Of the prairies, not much need be said; they are flat, covered with a fine growth of grass, and interposed with "bluffs,"‡ which are

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Manitoba," 'Natural History Journal,' vol. ix., p. 67. "Notes on the Land and Fresh-water Mollusca of Manitoba," 'Journal of Conchology,' vol. iv., p. 339. "Notes on a Visit to the Bell Farm," 'Field,' Dec. 27, 1884. "On the Absence of Earthworms from the Prairies of the Canadian North-West," 'Nature,' Jan. 3, 1884; and 'Report of the Manitoba Department of Agriculture for 1883, p. 349. "On the Power of Penetrating the Bodies of Animals possessed by the Seeds of *Stipa spartea*," 'Report of the Manitoba Department of Agriculture for 1883,' p. 353; and (Abstract) 'Proc. Linnean Soc.' 1883—86 p. 57.

† Better known by his literary *nom de plume* of E. E. T. Seton.

‡ On the Manitoban prairies, any isolated copse or cluster of trees is called a "bluff"; while "sleugh" (pronounced *slew*) is the invariable name for a wet, marshy spot, or shallow pond.

gradually disappearing before the hungry fire. If prairie-fires had been by some means arrested fifty years since, Manitoba would to-day have been a densely-wooded, instead of a prairie, country. The fire, too, annually destroys the young trees that spring up. In the moister parts, where lakes, "sleughs," and ponds arrest the progress of the fires, extensive woods of poplar are found, in which many woodland birds and plants are able to find a home, even though Manitoba is essentially a prairie country. Of the excessive fertility of the prairie soil there is no question.

The collection which I formed at the time of my visit may now be seen at the British Museum at South Kensington. It has been carefully worked out by the officers of the Department of Botany, to whose kindness I am deeply indebted.

As I have already more than once pointed out, the popular idea which pictures Manitoba as an icy and inhospitable region is altogether wrong, so far as the summer season is concerned. Of the winter, this description may not be altogether inaccurate; but the Manitoban summer, though short, is of a kind which many another nation may well envy. From the first appearance of spring, until the early frosts of autumn have set in, the Manitoban prairies form in fact a gigantic natural flower-garden, in which a most surprising succession of different forms is kept up. An ordinary English meadow cannot in any respect compete with the prairies, so far as floral display is concerned. By no means a few of our cherished garden flowers are still represented in abundance on the prairies of Manitoba by their original stock. Nor are the insects necessary for the fertilisation of these brilliant flowers in any respect wanting during the proper seasons. Mosquitoes are vastly more numerous than either man or beast desires; large dragonflies (commonly known as "mosquito-hawks") at times are surprisingly numerous; butterflies, ants, moths, and grasshoppers abound everywhere; while fair-sized humble bees, though not abundant, are far from rare. Among the few which I brought home are several which will probably prove to be new species. These facts need surprise no one who remembers that Winnipeg is much nearer the latitude of Paris than of London.

I have elsewhere published* strong reasons for believing that the prairies of the Canadian North-West cannot be regarded as due to natural causes. Their treelessness and their black fertile soil are unquestionably due largely (if not entirely) to the action of the fires, which for generations past have annually swept over vast areas of central North America, consuming the grass, killing and burning the trees, and thus everywhere extending the open country. I have also pointed out that several notable facts in connection with the distribution of various species of animals now living on the prairies are in all probability due to the action of the fires; and it will be evident that the same cause must also have had some effect in altering the flora of the region. If a large part of the country was formerly covered with timber, it is clear that the

* 'Manitoba Described,' p. 20.

plants growing there must, on the forest being converted into prairie, have either radically changed their habit or been much decreased in numbers, even to extermination; while those plants accustomed to living in an open country would in the course of time become largely increased in numbers, provided of course that their habits were such as to enable them to withstand extermination by the action of the fires. At the present time, nothing of the nature of a shrub growing upon the bare open prairie seems able to hold its own against the fire with any success, except the dwarf prairie rose (*Rosa acicularis*), the wolf willow (*Eleagnus argentea*), and several allied species of willow (*Salix*). Again, it can hardly be supposed that the extermination (now practically, if not actually, complete) of an animal once so numerous on the prairies and so essentially characteristic of them, as the buffalo, has not had some effect upon the prairie flora. I shall have occasion to allude to this point again when speaking of *Stipa spartea*, *Astragalus caryocarpus*, and *Sanicula Marylandica*. These causes must have had some effect upon the prairie flora; but it is unnecessary to treat further of the subject here, as it can only be done from a standpoint which is largely speculative. The same or similar effects, though often unnoticed, probably are taking, or have taken, place in all countries where man has largely interfered with the balance of Nature.

Nothing in connection with the flora of the prairies struck me more than the regular succession in which the different species blossomed. One month, or one period, was marked by a group of flowers totally distinct from that appearing in the following or preceding month or period. Many times over I observed some previously unnoticed species bursting into flower more or less abundantly in the course of a few days, to be replaced somewhat later by another kind or other kinds, equally unobserved up to that time. This peculiarity was, perhaps, more noticeable among the Asters, the Solidagos, the Gentians, and the Œnotheras, than in the case of any other species. The same thing may of course to some extent be observed in England, but still not to anything like the same noticeable extent it is in Manitoba. The powerfully-disturbing influence of cultivation which comes into play here, but is as yet entirely absent from wide areas on the prairies, is undoubtedly accountable for this. Evidence of this, indeed, is afforded by the fact that on ground that has been recently "broken" or ploughed, and on the "fire-guards" ploughed by settlers round their premises to protect their buildings from the fire, the disturbing influence of cultivation is very noticeable. From such spots I was often able to obtain specimens of flowers the bulk of which had blossomed long—some of them *months*—before I arrived in the country. The plants flourishing in such situations were, too, frequently of a different species from those growing on the undisturbed prairie immediately around. *Achillea Millefolium*, *Lophanthus anisotus*, *Chenopodium album*, and others are the plants which most frequently spring up when the soil of the prairie is disturbed. I do not, indeed, ever remember seeing the last-named growing on

the undisturbed prairie away from houses, though it may do so. The great increase in the size of the plants and their flowers when growing on these disturbed patches of ground is generally most noticeable. The effect is precisely similar to that occasioned when a meadow plant is removed from all competition by being transplanted to the rich soil of a garden. *Rudbeckia hirta*, commonly called the "sunflower," often makes a great show on "breaking" that has been left undisturbed for an entire year.

Towards the close of August this constant succession of flowers seems to come almost to an end. There is then little or nothing visible, except here and there a belated flower or two belonging to a variety of incongruous species. This interregnum (so to speak) lasted several days during my visit in 1883. About September 7th, however, the bright blue prairie gentian (*G. affinis*) suddenly burst into flower abundantly everywhere on the open prairie, and lasted for about a fortnight. By the end of that time the prairie, hitherto so gay, had become of a uniform sombre brown; while the grass, hitherto green, became dead, dry, and highly inflammable, ready to be burned by the first fire that the negligence of any settler or Indian might set going. I find the following entry in my journal on September 10th:—"With the flowers, all is now nearly over, and the prairies, which a few weeks ago were so gay, have now lost all their bright colours. The two species of golden rod (*Solidago rigida* and *S. odora*) are all but over, and nothing is left but odd remnants, among which are two asters, a few harebells (*C. rotundifolia*), an *Artemisia* (*A. Ludoviciana*), and one or two others, while the hips of the prairie rose (*R. acicularis*) have assumed their bright red autumnal tints; yet, as a finish, we have still the bright blue prairie gentian (*G. affinis*), which promises to last some time longer." A few days later I find the following entry:—"Mushrooms (apparently identical with the English ones) have been abundant for some time, and are still common. The prairie daily gets more brown, dingy, and devoid of flowers, except for the beautiful blue gentian, which seems as if it had not yet passed its best. The late frosts have turned the leaves of many of the bushes a very brilliant red."

Another thing noticeable on the prairies, and also attributable to the absence of the disturbing influence of cultivation, is the complete absence (so far as I observed) of abnormally white varieties of flowers usually coloured. In Europe the coloured members of the genera *Gentiana* and *Campanula* commonly produce white varieties. In Manitoba, though equally common, I never saw them do so. One one occasion I saw a light-coloured flower of *Solidago odora*, and on another a similar flower of *Liatris scariosa*, but these were the only variations I observed.

The following is a list of the species, specimens of which I brought home. In writing it I have consulted Prof. Macoun's 'Catalogue of the Phænogamous and Cryptogamous Plants of the Dominion of Canada' (Belleville, 1878), his (as yet incomplete) 'Catalogue of Canadian Plants' (Montreal, 1883, &c.), Gray's 'Flora of North America,' &c.

Anemone patens var. *Nuttalliana* Gray. Commonly called "Sand-flower" or "May-flower." Excessively abundant all over the prairie in very early spring. Its flowers appear in great abundance at the earliest possible opportunity after the disappearance of the snow. It is always the first flower thus to put in an appearance, and Mr. Thompson describes its rapid and sudden flowering as a very striking fact. At the early period at which these flowers appear they form almost the only green thing upon the prairie, as the leaves do not appear until later: consequently they are eaten by nearly every animal that lives upon the prairie—sheep, cattle, gophers, prairie chickens, and doubtless the buffaloes while they still existed. Were it not for these flowers, the wild animals would be very short of food for the first week or two of spring. Doubtless this habit of flowering earlier than most other plants gives to the species some advantage which more compensates for the large number of its flowers that are consumed.—*A. Virginiana* L. Very abundant on the drier portions of the prairie wherever I went. In the autumn, after flowering, the heads fluff out into balls of what looks like cotton-wool, often one inch in diameter. These are soon blown away by the wind, but some remain till quite late in the winter.—*A. dichotoma* L. Common in moist spots on the prairie and beside sleughs. Flowers during July.

Caltha palustris L. Common on the edge of the Great Swamp.

Sarracenia purpurea L. The Indian Pitcher-plant. Very common over large areas in the Great Swamp, where the tamaracs grow less densely. On July 24th I found all the plants in seed.

Helianthemum Canadense Michx. Very uncommon. I only saw it in one spot, namely, in the edge of a bluff near Carberry, on August 4th, when it was in full flower. Macoun gives "Plains of the Saskatchewan," but regards the locality as doubtful.

Drosera rotundifolia L. Fairly common in the Great Swamp.—*D. intermedia* Hayne. Abundant in the more open spots in the Great Swamp. I found plants still in flower on August 7th.

Saponaria Vaccaria L. An introduction. I found it growing sparingly in an oat-field near Carberry.

Lychnis Githago Lam. Not uncommon in wheat-fields and around houses, having of course been introduced with seed-corn.

Linum perenne L. Very common in many places on the prairie.—*L. sulcatum ?* In flower abundantly on July 26th, over a very limited area on the summit of the very highest of the sand-hills, which is quite the highest elevation within some miles of Carberry. Not seen elsewhere. So far as I could see, it is not a heterostyled species. The petals become detached very readily.

Geranium Carolinianum L. Macoun speaks of it as very abundant in thickets and lately-burned woods from Nova Scotia to the Pacific, but I only observed it once, namely, on the open prairie near Carberry.

(To be continued.)

A SYNOPSIS OF *TILLANDSIEÆ*.

By J. G. Baker, F.R.S., F.L.S.

(Continued from p. 246).

68. Tillandsia foliosa Mart. et Gal. Enum. ii. 9, non Griseb.—Leaves in a dense rosette; ovate dilated base above an inch broad; blade lanceolate-subulate, rigidly coriaceous, a foot long, thinly lepidote, ½–¾ in. broad low down, tapering gradually to the point. Peduncle 9–12 in. long; bract-leaves with long points. Panicle dense, 4–8 in. long; branches many, ascending, sessile, 1½–2 in. long, ¾ in. diam.; branch-bracts small, ovate; flowers ascending, scarcely imbricated; flower-bracts oblong, acute, nearly glabrous. Calyx reaching nearly to the tip of the bract; sepals oblong, obtuse, strongly keeled. Petals not seen. Capsule 1–1¼ in. long.

Hab. Mexico; Mountains of Xalapa, alt. 4000 ft., *Galeotti* 4909. Valley of Cordova, *Bourgeau* 1908! *Hahn*! Differs from *T. Balbisiana* by its less utricular leaf-bases and larger spikes. I have identified it from the description only.

69. T. fasciculata Swartz, Prodr. 56; Fl. Ind. Occ. i. 586; Roem. et Schultes, Syst. Veg. vii. 1211; Griseb. Fl. Brit. West. Ind. 595; Sagra, Fl. Cub. iii. 267. *T. bracteata* Chapm. Fl. Southern States, 471. *Platystachys digitata* Beer, Brom. 84. *T. havanensis* Jacq. Amer. Pict. t. 94. *P. havanensis* Beer, Brom. 85.—Leaves densely rosulate; dilated ovate base 3–4 in. long, 2 in. broad; blade linear-convolute, 1–1½ ft. long, rigidly coriaceous, finely lepidote, tapering gradually to a long point. Peduncle ½–1 ft. long; bract-leaves crowded, with long erect points. Spikes few or many, forming a dense panicle, 2–4 in. long, ¾–1 in. broad; side spikes erecto-patent; flower-bracts ovate, acute, strongly keeled, 1–1½ in. long, ¾–1 in. broad, thinly finely lepidote. Calyx ¾–1 in. long. Corolla tubular, violet, twice as long as the calyx. Stamens a little exserted. Capsule 1½ in. long.

Hab. Florida, *Curtiss* 2844! Bahamas, *Swainson*! Cuba, *Wright* 680! 681! Jamaica, *Swartz*! *Purdie*! Dominica, *Imray*! St. Vincents, *Guilding*! St. Domingo, *Mackenzie*! *Jacquemont*! Mexico; Province of Puebla, *Andrieux* 59! Cordova, *Bourgeau* 1768!

70. **T. Parryi,** n. sp. — Dilated base of leaf ovate, 4 in. long, 3 in. broad; blade lanceolate, a foot long, tapering gradually from a base 1–1½ in. broad to a subulate apex, rigidly coriaceous, thinly persistently lepidote on both sides. Panicle rhomboid, 8–9 in. long; spikes about 5, ascending, simple, dense, 4–5 in. long, an inch broad; branch-bracts small, ovate, bright red; flower-bracts oblong-lanceolate, acute, naked, bright red, 1¼–1½ in. long, ¾ in. broad at the middle. Calyx an inch long. Petal-blade oblong, ½ in. long. Stamens not protruded beyond the tip of the petals.

Hab. Central Mexico; mountains of San Luis Potosi, alt. 6000–8000 ft., *Parry & Palmer* 873!

71. T. latifolia Meyen inedit. *Platystachys latifolia* K. Koch in Ind. Sem. Berol. 1873, App. iv. 5.—Leaves lanceolate-setaceous,

a foot or more long, spreading, lepidote. Panicle often a foot long, 4–5 in. diam.; spikes many, crowded, 3 in. long, ¾ in. diam, often viviparous at the apex; flower-bract as long as the calyx, glabrous. Corolla 1½ in. long.

Hab. Peru, *Meyen*, *Gaudichaud*. Near *T. Kunthiana* Gaudich.

72. T. ROBUSTA Griseb. in Gott. Nacht. 1864, 15. — Leaves lanceolate-setaceous from a dilated base, densely lepidote, not more than a quarter as long as the robust stem. Inflorescence a panicle of few distant erecto-patent spikes; flower-bracts oblong-lanceolate, subacute, three times as long as the calyx. Sepals oblong-lanceolate. Petal-blade as long as the calyx. Capsule shorter than the flower-bracts.

Hab. Mountains of Venezuela, alt. 3000 ft., *Fendler* 1525.

73. T. SECUNDA H. B. K. Nov. Gen. i. 294; Roem. et Schultes, Syst. Veg. vii. 1223. — Whole plant 3 ft. or more high, with the habit of a *Bromelia*. Leaves linear-lanceolate, acuminate, nearly flat, rigidly coriaceous, lepidote, 9–12 in. long, ¾ in. broad low down. Inflorescence a panicle of many distant sessile spikes ½ ft. long; flowers secund; flower-bracts ovate-oblong, acute, glabrous, ½ in. long. Calyx shorter than the bract. Petal-limb as long as the calyx, dark violet. Stamens as long as the petals. Capsule an inch long.

Hab. Andes of Ecuador, on the banks of the River Guallabamba, *Humboldt*.

74. T. ELONGATA H. B. K. Nov. Gen. i. 293; Roem. et Schultes, Syst. Veg. vii. 1223; Griseb. in Gott. Nacht. 1864, 17.—Leaves in a dense rosette; dilated base ovate, 4–5 in. long, 3 in. broad; blade lanceolate-setaceous, 2–3 ft. long, an inch broad at the middle, rigidly coriaceous, obscurely lepidote. Peduncle stout, 2 ft. long; bract-leaves crowded, with long erect free points. Panicle a foot or more long; lower branches compound; branch-bracts ovate, with long linear tips; spikes dense, 1½–2 in. long; flower-bracts ovate, acute, ½ in. long. Calyx as long as the bract. Petal-limb as long as the calyx. Capsule cylindrical, an inch long.

Hab. New Granada, near Honda and Melgar, *Humboldt*. Mountains of Venezuela, *Fendler* 1522!

75. **T. Dugesii,** n. sp.—Leaves densely rosulate; dilated ovate base 5–6 in. long, 2½ in. broad; blade lanceolate-setaceous, convolute in the upper half, 2 ft. long, an inch broad low down, rigidly coriaceous, finely lepidote-pubescent, especially on the back. Peduncle very stout, much shorter than the leaves. Inflorescence a dense panicle above a foot long, composed of 20–30 erecto-patent oblong simple nearly sessile spikes 2–3 in. long, 1 in. diam.; lower branch-bracts ovate, glossy, shorter than their spikes; flower-bracts oblong, acute, glossy, sharply keeled, 1–1¼ in. long, ½ in. broad. Calyx an inch long. Petals and capsule not seen.

Hab. Northern Mexico; Guanajuato, *Duges*, gathered in 1885. Received from Dr. Asa Gray. One of the largest species of this section; allied to *T. violacea*.

76. **T. Bourgæi,** n. sp.—Leaves densely rosulate; dilated base 3–4 in. long, 1½–2 lin. broad; blade lanceolate, with a long

setaceous point, 1½–ft. long, an inch broad low down, rigidly coriaceous, persistently finely adpresso-lepidote. Peduncle stout, shorter than the leaves. Inflorescence a dense panicle a foot or more long, composed of very numerous erecto-patent simple nearly sessile dense oblong spikes, 2–3 in. long, an inch broad in the flowering stage; lower branch-bracts with long setaceous points, much exceeding the spikes; flower-bracts ovate, acute, an inch long, lepidote, ¾ in. broad low down. Calyx reaching to the tip of the bract. Petal-blade convolute in a cylindrical tube, ½ in. longer than the calyx. Style and stamens longer than the petals. Capsule-valves an inch long, ⅓ in. broad.

Hab. Mexico; rocks near Guadaloupe, *Bourgeau* 893! Collected in August, 1865. Very near T. *violacea*, from which it differs by its shorter ovate flower-bracts.

77. **T. violacea,** n. sp. *Platystachys violaceus* Beer, Brom. 264 (name only).—Leaves densely rosulate; dilated base ovate, 3–4 in. long; blade lanceolate, with a long setaceous point, 1½ ft. long, an inch broad low down, rigidly coriaceous, thinly lepidote. Peduncle very robust, shorter than the leaves. Inflorescence a panicle a foot long, composed of many erecto-patent simple nearly sessile oblong spikes 2½–3 in. long, an inch broad; lower branch-bracts much exceeding the spikes; lowest sometimes a foot long; flower-bracts oblong, acute, glabrous, 1–1¼ in. long, ½ in. broad at the middle. Calyx naked, an inch long. Petals violet, convolute in a cylindrical tube, ½ in. longer than the calyx. Stamens and style longer than the petals. Capsule-valves 1¼–1½ in. long, ⅓ in. broad.

Hab. Mexico; high mountains near Toluca, on the rocks, *Andrieux* 60!

78. **T. Cossoni,** n. sp. — Basal leaves not seen. Peduncle stout; bract-leaves crowded, with large lanceolate free points. Inflorescence a dense panicle above a foot long, composed of 30 or more oblong acute simple erecto-patent dense nearly sessile spikes 2–3 in. long, 1 in. broad; branch-bracts ovate, bright red, many as long as the spikes, the lowest scarcely longer; flower-bracts ovate, acute, stramineous, naked, an inch long, ¾ in. diam. low down. Calyx an inch long, glabrous; sepals lanceolate, acute. Petals convolute in a cylindrical tube, ½ in. longer than the calyx.

Hab. Mexican Desert, *Bilimek* 440! Gathered in December, 1865. Received from Dr. Cosson. A very large species, allied to *T. violacea* and *Duyesii*.

79. T. HUMILIS Presl, Rel. Haenk. ii. 125; Roem. et Schultes, Syst. vii. 1203. — Stem 3 in. long; leaves linear-subulate, about 4 in. long, rigidly coriaceous, densely persistently lepidote. Spike simple, oblong, moderately lax, an inch long; flowers about 5; rachis flexuose; flower-bracts ovate, mucronulate, 4–5 lines long, coloured. Calyx nearly twice as long as the bract. Petal-limb ovate, acute, patent.

Hab. Chili, *Haenke*. May be a *Phytarhiza*. Not seen.

80. T. PALEACEA Presl, Rel. Haenk. ii. 125; Roem. et Schultes, Syst. vii. 1203. — Leaves linear-subulate, 2–3 in. long, ⅙ in. broad low down, clothed with spreading lanceolate silvery scales.

Peduncle 2 in. long. Spike oblong, an inch long; flowers about 4; flower-bracts ovate-oblong, $\frac{1}{3}$ in. long. Calyx as long as the bract. Petals unknown.

Hab. Chili, *Haenke*.

81. T. ARGENTEA Griseb. Cat. Cub. 254. — Rosettes tufted. Leaves densely rosulate, linear-subulate from an ovate base, 3–4 in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. broad low down, laxly albo-lepidote, especially beneath. Peduncle twice as long as the leaves. Spike simple, moderately dense, about 6-flowered; rachis flexuose; flower-bracts oblong-lanceolate, subacute, $\frac{1}{2}$ in. long, equalling the internodes. Calyx shorter than the bract; sepals oblong, obtuse. Capsule 2–3 times as long as the calyx.

Hab. Cuba, *C. Wright*. Not seen.

82. T. INCURVA Griseb. in Gott. Nacht. 1864, 15. — Leaves in a dense rosette; dilated base ovate, $1\frac{1}{4}$ in. broad; blade lanceolate-setaceous, 6–9 in. long, above $\frac{1}{2}$ in. broad low down, moderately firm in texture, densely persistently lepidote, tapering into a long setaceous point. Peduncle curved, 3 in. long; bract-leaves with long free points. Inflorescence a moderately dense simple spike 8–9 in. long, $\frac{3}{4}$ in. diam.; tip of one flower just reaching the base of the next; flower-bracts ovate, obtuse, glabrous, an inch long. Calyx reaching nearly to the tip of the bract. Petal-blade narrow, $\frac{1}{2}$ in. long. Capsule-valves lanceolate, $1\frac{3}{4}$ in. long.

Hab. Mountains of Venezuela, *Fendler* 1524!

83. T. MACROCNEMIS Griseb. Symb. Fl. Argent. 1878, 332. — Leaves densely rosulate, lanceolate-acuminate, 3–4 in. long, $\frac{1}{2}$ in. broad at base, rigidly coriaceous. Peduncle 1–2 in. long. Inflorescence a moderately dense simple distichous spike 2–3 in. long; flower-bracts lanceolate, 2 in. long. Sepals $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, lanceolate. Petals not seen.

Hab. Argentine territory; Province of Cordoba, *Lorentz* 123! Very distinct.

84. **T. yucatana**, n. sp.—Leaves 8–12 in a rosette, lanceolate-setaceous, 3–4 in. long, $\frac{3}{4}$ in. broad at dilated base, rigidly coriaceous, densely finely lepidote on both surfaces. Peduncle 2–3 in. long; bract-leaves crowded, with long free points. Spike simple, erect, moderately dense, 3–4 in. long, 1 in. diam.; flower-bracts oblong-lanceolate, lepidote, 1–$1\frac{1}{2}$ in. long. Calyx $\frac{1}{2}$–$\frac{3}{4}$ in. long; sepals lanceolate.

Hab. Merigla, Yucatan, *Schott* 250! (Herb. Mus. Brit.). Habit of *T. canescens* Sw.

85. T. CONSPERSA Miquel in Linnæa, xviii. 376.—Leaves densely rosulate, linear-setaceous, 4–5 in. long, rigidly coriaceous, densely clothed with argenteous lepidote scales. Peduncle 4 in. long. Inflorescence a simple spike 2 in. long; flowers 12–15, moderately close; flower-bracts lanceolate, spreading, the lower longer than the flowers, which are nearly an inch long.

Hab. Surinam; on dead trees near Paramaribo. (Not seen.) Habit of *T. setacea* Sw.

86. **T. sublaxa**, n. sp. — Leaves few in a utriculate rosette; dilated base ovate, 2 in. long, an inch broad; blade linear-setaceous,

½ ft. long, ⅓ in. broad at the middle, moderately firm in texture, thinly persistently adpresso-lepidote. Peduncle rather longer than the leaves; lower bract-leaves with long free points. Inflorescence a moderately dense simple erect spike 4–5 in. long; flowers 6–8 on a side, very ascending; rachis flexuose; flower-bracts lanceolate, ¾–⅞ in. long, ⅙ in. broad. Calyx ½ in. long; sepals oblong, obtuse. Corolla convolute, twice as long as the calyx. Immature capsule as long as the bract.

Hab. Jamaica; Plain of Westmoreland, on log-wood trees, *Purdie*!

87. T. MONADELPHA Baker. *Phytarhiza monadelpha* E. Morren in Belg. Hort. 1882, 168, t. 7.—Leaves 50–60 in a rosette; dilated ovate base 2 in. long, an inch broad; blade linear-acuminate, red-brown, channelled, 7–8 in. long, ¼ in. broad at the middle. Peduncle 6–8 in. long; bract-leaves small, not imbricated. Inflorescence a simple moderately dense erect spike 4–5 in. long; flowers about 10 on a side, erecto-patent; flower-bract ovate, acute, as long as the calyx. Calyx ¾ in. long; sepals acute. Petal-blade oblong, whitish, ¼–⅓ in. long. Style and stamens not longer than the calyx. Capsule above 2 in. long.

Hab. Guiana. Flowered in cultivation by Linden in 1874. Recedes from typical *Platystachys* by its thin subglabrous leaves, white flower, and short stamens and pistil.

88. **T. graminifolia,** n. sp. — Leaves 40–60 to a rosette, erect, linear-setaceous, under a foot long, ¼ in. broad at the middle, ½ in. at the dilated base, thin, flexible, subglabrous. Peduncle as long as the leaves; lower bract-leaves with linear free points; upper lanceolate, small, imbricated, entirely adpressed. Inflorescence a moderately dense simple erect spike 2–3 in. long; flowers about 6 on a side, erecto-patent; flower-bract oblong-lanceolate, glabrous, ½ in. long. Calyx as long as the bract. Petals 2, upper greenish yellow, lower white. Capsule-valves linear, 1½–2 in. long.

Hab. Cayenne, *Martin*! *Poiteau*! *Sagot* 859! Demerara, *Parker*! Trinidad, *Fendler* 828! Nearly allied to *T. monadelpha*.

(To be continued.)

SHORT NOTES.

SAXIFRAGA CÆSPITOSA L. — I see that Watson's 'Topographical Botany,' ed. 2, p. 183, does not admit this plant as a native of Wales. I have before me a specimen gathered at Twll Ddû, in Carnarvonshire, in 1835, by Mr. J. Roberts, a botanist of Bangor well known at that time. I see that Watson did not admit it in the 1st edition. I cannot have any doubt of the specimen belonging to *S. cæspitosa*, and have perfect confidence in Mr. Roberts. I have also the *S. incurvifolia* (D. Don) distributed by the late Mr. J. Dickson as *S. cæspitosa* (a variety of which it is), and given to me by the late Rev. T. Gisborne, who obtained it from him, as gathered in Westmoreland many years since. Of the correctness of this name also there can be no doubt.—C. C. BABINGTON.

Ceratophyllum apiculatum Cham. in Huntingdonshire.—On August 16th I found this plant in a ditch by Earith Stanch. Although it was growing in deep water it was fruiting abundantly. The fruit resembles that of *C. demersum* in the length of the style, which considerably exceeds the nut, but at the base are ten minute, blunt tubercles instead of spines. When fresh the fruit is smooth and covered with reddish brown dots, which are slightly elevated above the surface when dried, roughening the skin. It may thus be considered exactly intermediate between *submersum* and *demersum*. I think this form has not been hitherto recorded as British.—Alfred Fryer.

Potamogeton polygonifolius Pour. from Huntingdonshire.—In the herbarium of the late Mr. John Hardy (now in the possession of Mr. Charles Bailey) there is a pondweed labelled in the handwriting of the late Rev. W. W. Newbould:—"*Potamogeton* (*polygonifolius* W. W. N. 1885), ex Herb. John Hardy, Manchester. River Ouse, June 23, 1846. Col. Rev. W. W. Newbould." In 1885 Mr. Newbould, who was then visiting Mr. Bailey, added the name printed above in brackets. It is roughly written in pencil, either by himself or in his presence by Mr. Bailey, thus confirming the local record and adding the name which he was unable to give in 1846. As *P. polygonifolius* has been recorded in Cambridgeshire from Gamlingay only, and as it now seems to be extinct at Bluntisham, where the unlikely habitat of a *tidal* river is given for it, I have thought it advisable to give an exact copy of the label as it now stands in Mr. Bailey's herbarium, and also to call attention to the circumstance of Mr. Newbould having examined the sheet of specimens and added the specific name after an interval of forty years. Twice during the present season I have carefully searched the ditches in the peaty meadows between Bluntisham and the Ouse, and also the Ouse itself, but I have been unable to find *P. polygonifolius*. The following species occur in the river:—*P. natans*, *P. lucens*, *P. perfoliatus*, *P. crispus*, *P. Friesii*, and *P. flabellatus*; and in the meadows, in addition to these, *P. densus*; all, except the latter, deep-water forms, such as we should not expect to occur with such a moorland form as *P. polygonifolius*. On the other hand, the Ouse at Bluntisham runs through a bed of peat, and has on its Huntingdonshire margin several shallows, some of which are only occasionally submerged. These might have afforded suitable stations for *P. polygonifolius*, and remembering Mr. Newbould's scrupulous accuracy I think we may safety give this rare Eastern Counties plant a place in the Huntingdonshire Flora.—Alfred Fryer.

NOTICES OF BOOKS.

Mr. Baker's 'Handbook of the Fern Allies' (*Equisetaceæ*, *Lycopodiaceæ*, *Selaginellaceæ*, *Rhizocarpeæ*; Bell & Sons) is a most useful volume, and one the want of which, to use a conventional phrase, has long been felt. Until Mr. Baker's 'Synopsis of *Selaginella*'

appeared in our pages there was nothing like a complete or systematic catalogue of the species of this genus. The present enumeration includes 334 species, of which the following new ones are here published for the first time :—*S. arabica*, *S. cayennensis*, *S. brachyclada*, *S. Jenmani*, *S. Solmsii*, *S. dendricola* Jenman, *S. Poulteri* Hort. Veitch., *S. Pringlei*, *S. Wattii*, and *S. Wrayi*. As nearly the whole of the volume first appeared in the pages of this Journal, we think the preface should have contained some indication of the fact.

New Books. — C. Joret, 'Flore populaire de la Normandie' (Paris, Maisonneuve : 8vo, pp. lxxxviii. 239). — M. Waldner, 'Die Entwickelung der Sporogone von *Andræa* und *Sphagnum*' (Leipzig, Felix : 8vo, pp. 25, tt. 4). — A. Le Grand, 'Flore analytique du Berry' (Bourges, Berneau : 8vo, pp. lxvi. 347). — E. Burnat & E. Gremli, 'Genre *Rosa* ; revision de groupe des Orientales' (Geneva, Georg : 8vo, pp. vii. 95).—J. Brunchorst, 'De Vigtigist Plantesygdomme' (Bergen, Griertsen : 8vo, pp. [viii.] 215 : 41 cuts). — L. Lerollie, 'Essai d'un groupement des Familles Végétales' (Paris, Savy : 8vo, pp. 100 : 3 *fr.*). — H. Ribbert, 'Der Untergang pathogener Schimmelpilze in Körper' (Bonn, Cohen : 8vo, pp. 97 : 1 plate).

Articles in Journals.

American Naturalist (Aug.). — E. L. Sturtevant, 'History of Garden Vegetables.' — H. C. Abbott, 'Comparative Chemistry of Higher and Lower Plants.'

Bot. Centralblatt. (Nos. 31–34). — S. Gheorgieff, 'Beitrag zur vergleichenden Anatomie der Chenopodiaceen.' — (No. 35). R. v. Wettstein, 'Ueber *Helotium Willkommii*.'

Botanical Gazette (July). — H. C. Bumpus & C. R. Barnes, Registering Auxanometers (2 plates). — S. Coulter, 'Spirogyra under shock.' — J. M. Coulter & J. N. Rose, '*Umbelliferæ* of E. United States' (1 plate : *Pimpinella Parishii* sp. n.). — G. Vasey, 'Fasciation in *Sophora secundiflora*' (1 plate).

Bot. Zeitung (July 22).—T. W. Engelmann, 'Die Farben bunter Laubblätter und ihre Bedeutung für die Zerlegung der Kohlensäure im Lichte.'—(July 30). F. Noll, 'Ueber Membranwachsthum und einige physiologische Erscheinungen bei Siphoneen.' — (Aug. 5, 12, 19, 26). S. Winogradsky, 'Ueber Schwefelbacterien.'

Bull. Soc. Bot. Belgique (xxvi., 1 : Aug. 9).—F. Crépin, 'Notice biographique sur C. J. E. Morren.' — J. Cardot, 'Révision des Sphaignes de l'Amérique du Nord.' — Ch. A. Strail, 'Essai de Classification et descriptions des Menthes qu'on rencontre en Belgique.' — V. Monton, 'Ascomycètes observés aux environs de Liége.' — E. Bommer & M. Rousseau, 'Contributions à la Flore mycologique de Belgique.'

Gardeners' Chronicle (July 30).—*Crinum crassipes* Baker, *Urginea eriospermoides* Baker, *Epidendron Kienastii* Rchb. f., spp. nn.—(Aug. 6). *Selaginella potaroensis* Jenman, n. sp. — R. A. Rolfe,

'*Dendrobium pulchellum*.' — Malformation in *Cypripedium superbiens* (fig. 37). — 'The Plymouth Strawberry' (fig. 38). — W. G. Smith, '*Dactylium roseum*' (fig. 40). — (Aug. 13). *Cirrhopetalum stragularium* Rchb. f., *Mammillaria cornimamma* N. E. Br., spp. nn. — T. Ito, '*Psilotum triquetrum*' (figs. 43–47).—(Aug. 20). *Saccolabium Smeeanum* Rchb. f. — G. Pim, '*Puccinia Vincæ*' (figs. 57, 58).—(Aug. 27). *Maxillaria molitor* Rchb. f., sp. n.

Journal de Botanique (Aug. 1, 15). — L. Dufour, 'Influence de la lumière sur feuilles.'— E. Bonnet, 'Florule des îles Saint-Pierre et Miquelon.'— —. Hy, 'Sur le genre *Microchæte*' (*M. striatula*, sp. n.). — E. G. Camus, 'Sur les Anémones du type de l'*Anemone Pulsatilla*' (1 plate).

Journ. Linn. Soc. (Aug. 20).—Sir J. Lubbock, 'Phytobiological Observations.' — C. B. Plowright, 'Experimental Observations on certain British Heterœcious Uredines.' — T. H. Huxley, 'The Gentians: Notes and queries.' — N. E. Brown, '*Vaccinium intermedium* Rutke, a new British Plant' (1 plate).

Notarisia (July).—'Algæ Novæ Diagnoses.'

Nuovo Giornale Bot. Ital. (July 20).—P. Voglino, 'Observationes analyticæ in Fungos Agaricinos' (3 plates). — T. Caruel, 'L'orto e il museo botanico di Firenze nell' anno 1885–86.' — F. Delpino, 'Equazione chimica e fisiologica del processo della fermentazione alcoolica.'

Oesterr. Bot. Zeitschrift. (Aug.).— L. Celakovský, 'Ueber einige neue orientalische Pflanzenarten' (*Thymus pulvinatus*, *T. humillimus*, *T. sedoides*, *T. Sintenisii*, spp. nn.). — B. Blocki, *Rosa leopoliensis*, sp. n. — G. Schneider, 'Mittheilungen über die Hieracien des Riesengebirges.'

Scottish Naturalist (July). — Arthur Bennett, 'Notes on *Nuphar pumilum* and *N. intermedium*.'—J. W. H. Trail, 'Revision of Scotch *Sphæropsideæ* and *Melanconieæ*.'

Trans. Linn. Soc. London (July). — F. O. Bower, 'On Apospory and allied phenomena' (3 plates). — E. F. im Thurn, 'Botany of Roraima Expedition of 1884' (*Leitgebia Imthurniana* Oliv., *Moronobea intermedia* Engl., *Bonnetia Roraimæ* Oliv., *Tetrapteris rhodopteron* Oliv., *Ravenia ruellioides* Oliv., *Myrtus stenophylla* Oliv., *Myrcia Roraimæ* Oliv., *Microlicia bryanthoides* Oliv., *Crepinella* (nov. gen. *Araliacearum*) *gracilis* Marchal, *Sciadophyllum coriaceum* Marchal, *Psychotria Imthurniana* Oliv., *P. concinna* Oliv., *Bacchuris Vitis-Idæa* Oliv., *Calea ternifolia* Oliv., *Vincetoxicum hirtellum* Oliv., *Lasianthus Imthurnianus* Oliv., *Melasma ? spathaceum* Oliv., *Utricularia Campbellianum* Oliv., *Tabebuia Roraimæ* Oliv., *Phoradendron Roraimæ* Oliv., *Epidendrum alsum* Ridl., *E. Imthurnii* Ridl., *E. montigena* Ridl., *E. violascens* Ridl., *Zygopetalum venustum* Ridl., *Oncidium orthostates* Ridl., *Spiranthes bifida*, Ridl., *Stenoptera adnata* Ridl., *Pelexia aphylla* Ridl., *Habenaria Moritzii* Ridl., *Tofieldia Schomburgkiana* Oliv., *Xyris setigera* Oliv., *X. witsenioides* Oliv., *Abolboda Sceptrum* Oliv., *Pæpalanthus Roraimæ* Oliv., *Anthurium roraimense* N. E. Br., *Everardia* (nov. gen. *Cryptangiearum*) *montana*

Ridl., *Alsophila macrosora* Baker, *Hymenophyllum dejectum* Baker, *Nephrodium brachypodum* Baker, *Polypodium demeraranum* Baker, *P. roraimense* Baker, *P. Kalbreyeri* Baker, *P. Kookenamæ* Jenman, *P. melanotrichum* Baker, *Gymnogramme cyclophylla* Baker, *G. elaphoglossoides* Baker, *Enterosora* (gen. nov.) *Campbellii* Baker, *Acrostichum leptophlebium* Baker, *Selaginella vernicosa* Baker, *S. roraimensis* Baker, *S. rhodostachya* Baker, *Blepharozia Roraimæ* Mitten, spp. nn.).

LINNEAN SOCIETY OF LONDON.

May 24*th*, 1887.—Anniversary Meeting.—William Carruthers, F.R.S., President, in the chair.—The Secretary read his report of the deaths, withdrawals, and elections of new Fellows for the past year. Since the last Anniversary Meeting 17 Fellows had died, or their deaths been ascertained, 8 had withdrawn, and 51 Fellows, 5 Foreign Members, and 5 Associates had been elected.—The President then read his annual address, which was mainly devoted to a *résumé* of the work of the Society during the past year, and concluded as follows:—"Before another anniversary comes round we shall have completed the hundredth year of our existence. On the 26th of February, 1788, seven men met in the Marlborough Coffee House, Great Marlborough Street, and held the first meeting of the Linnean Society. Dr. Smith, the happy possessor of the Linnean collections and library, was placed in the chair, a position which he occupied for the long period of forty years. Dr. Goodenough, then living at Ealing, was elected Treasurer. He made a careful study of our British Carices, and published the results in a model monograph in the second volume of the Society's Transactions. In 1808 he was promoted to the bishopric of Carlisle, where he died in 1827; and so late as 1880 his herbarium was presented by the civic authorities of Carlisle to Kew. Mr. Marsham was appointed Secretary. He was a distinguished entomologist, and communicated several papers to the Society, which duly found place in the 'Transactions.' Jonas Dryander, a distinguished pupil of Linnæus, and successor to Solander as Librarian to Sir Joseph Banks, was, at a subsequent meeting, appointed the first Librarian. James Dickson, a young gardener from Peebles, with a great love for botany and a critical knowledge of British mosses, was also present. He had prospered in business and had a shop in Covent Garden. Mr. Beckwith, an entomologist who described four new British moths at the meeting in March 1789, but was dead before the paper was published in 1794, and Mr. John Timothy Swainson, of H.M. Customs, and father of the distinguished zoologist, complete the number who were present at this first meeting. We seem now far separated from that meeting, yet I am happy to say that we have still with us Fellows who were admitted to the Society under its first President, and who connect us by a single link with that small meeting in the Marlborough Coffee House. The Rev. Leonard

Blomefield was elected on the 19th November, 1822. I had reason to hope that we might have been honoured with his presence here to-day. Students two generations ago were familiar with his 'Manual of British Vertebrate Animals,' 1835. John B. Mackay, an accurate British botanist, elected in 1824, now enjoys a green old age at Totteridge. And Prof. Westwood, admitted May 1st, 1827, is still, and I trust may yet long be, an active scientific worker. I hope we may have the presence of these veterans when we celebrate our hundredth anniversary. At the second meeting, held on the 18th of March, the roll of the original members of the Society was incorporated in the minutes. It consists of twenty names, and to this is added this note :—"The Rev. John Lightfoot, F.R.S., was one of the institutors of the Society, but died a day or two after the first meeting." From the foundation of the Society its meetings have been held twice a month; the first meeting in each month was confined to the Fellows, and was entirely devoted to business; the second, or general meeting, was open to Associates and visitors introduced by Fellows, and was held for reading memoirs and receiving exhibits. The Society for many years possessed only a very modest income, beginning, in its first year, with a total of £65. But its expenses were also small. No publications for some time swallowed up its funds. It was contented to occupy, for a modest rent, two rooms in Dr. Smith's house, No. 12, Great Marlborough Street. And it appointed the young and unfortunate Francis Borone its first officer, giving him the handsome salary of Five Guineas a year, "for his attendance on the Society at all times." Our centenary falls then on the 26th of February, 1887. On that day we shall be full one hundred years old. I venture to suggest that such an occasion should not be allowed to pass without some special celebration. The services we have, as a Society, rendered to biological science, more than justify our right to exist. The story of the Linnean Society during the century is the history of biology. That story would centre around three names which will ever be held in high honour by, I will not say all Linneans, but by all the world—the names, I mean, of our founder Sir James Edward Smith, of Robert Brown, and of Charles Darwin. These men represent the three great steps in biological science—the maintenance of the Linnean system, the philosophic illustration and establishment of the Natural System, and the study of the living organisms."

June 2nd.—William Carruthers, F.R.S., President, in the chair.—Mr. Ernest Clarke, Mr. F. M. Halford, Mr. H. B. James, and Prof. Robert Wallace were elected Fellows of the Society.—The President read the Address, to be presented to the Society's Patron, Her Majesty the Queen, in commemoration of the 50th year of her reign.—The President nominated Mr. F. Crisp, Prof. St. G. Mivart, Dr. Maxwell Masters, and Dr. J. Anderson, to be Vice-Presidents for the ensuing year.—Mr. D. H. Scott showed, under a high microscopic power, the presence of nuclei in *Oscillaria* and *Tolypothrix*. He explained that the plants were treated with picronigrosine for two hours, afterwards for two minutes with a

concentrated solution of chloral hydrate, and then mounted in glycerine. The nuclei resemble those of the "knot-stage" of higher plants, division stages being visible. The observation is important (1), with reference to the physiological question of the essential value of the nucleus to the vegetable cell, and (2) from a systematic point of view. Hitherto, from the alleged absence of a nucleus in the Schizophytes, these have been separated from the Thallophytes; but the distinction between the Cyanophyceæ and true Algæ would now seem broken down. These conclusions confirm those of Zacharias lately published in the Bot. Zeit., but whose investigations appear to have been in a measure anticipated by Wille in 1883.—Some preparations of the stem of *Macrocystis* were exhibited by Mr. Francis W. Oliver, which demonstrated the presence of plates of callus on the sieve-tubes of this gigantic laminarioid. The reactions are identical with those given by the same structures in such a plant as *Cucurbita*.—A paper was read by the Rev. G. Henslow, on "Transpiration as a Function of Protoplasm." To ascertain the effect of different rays of the solar spectrum on protoplasm without chlorophyll, the author grew mushrooms with proper precautions, so that no moisture could escape except from the plant exposed. He found that red, violet, and white light gave maxima; yellow, and total darkness, minima, if three places, if decimals be taken; if only two, there was practically no difference between colour and darkness. Clear light alone gave a decided increase. Somewhat similar results occurred with etiolate sea-kale, except that yellow as well as darkness gave a decided minimum, and clear light a maximum. On testing the results of transpiration in a saturated atmosphere he found that box, privet, and willow-herb always transpired by day, but either not at all or else gained weight at night. On the other hand, saturated cotton-wool and sponge continued to lose weight by day and night in a saturated atmosphere. Lastly, comparing transpiration from a living plant with evaporation from the same suddenly killed by scalding, he corroborated the results of others that transpiration is relatively less than evaporation, showing that living protoplasm keeps the loss of water in check.—A paper was read by Mr. Spencer Moore, "On the Influence of Light on Protoplasmic Movement," wherein he treats more especially of the day and night position of chlorophyll. He shows that protoplasm is affected by light, just as a solid body is when twisted or strained. Evidence is given proving that protoplasmic movement is accelerated by an increase in the intensity of light, and that the motion in question is not due to increased temperature. The protoplasm of *Elodea* and *Vallisneria* cells can be caused to rotate for several months by exposure to darkness, and this rotation does not differ in any way from ordinary or positive rotation.—Mr. M. C. Potter read a paper "On *Epiclemmydia lusitanica*, a new Alga growing on the back of a living Water Tortoise." The cells of the plant whose free surface is exposed to the water continually divide in directions perpendicular and parallel to the tortoise-shell plates; entering by cracks thereon, but deriving no nutriment from the

animal. Reproduction is by zoospores. The Alga belongs to the *Chlorophyceæ* and most likely ot the *Ulvaceæ*, in the family *Confervoideæ*.—Mr. H. N. Ridley read a paper "On a new Genus of Orchids from the Island of St. Thomas, West Africa." The structure of the column of this new orchid (*Orestias gracilis*) is quite unique in many respects.

June 16*th*. — William Carruthers, F.R.S., President, in the chair.—Mr. William Elborne, Mr. J. Thornhill, Mr. William Threlfall, and Mr. Edmund G. Baker were elected Fellows.—Lord Walsingham exhibited and made remarks on a living plant of *Datura* as a notable example of vegetable repair. The plant by açcident got broken almost right across the stem, whereon the gardener put it carelessly away in an outhouse, believing it sure to die. Some time after Lord Walsingham found the plant, not dead or drooping, but still showing fair signs of vitality. Thereupon it was taken back to the greenhouse, the stem bandaged, and in due time such union of the stem occurred as ultimately to leave only a scar as evidence of the fracture, the plant meanwhile thriving and showing vigorous growth.—The following botanical papers were then read:—"On the Flora of Munipore and Kohima," by Charles Baron Clarke, F.L.S.; "On a further Collection of Ferns from West Borneo, made by the Bishop of Singapore and Sarawak," by J. G. Baker, F.R.S., F.L.S.; "Fungi Japonici nonnulli," by Dr. Charles Spegazzini and Tokutaro Ito, F.L.S.; "Contributions to South-African Botany," Part III., by Harry Bolus, F.L.S.; "A Revision of the genera *Microstylis* and *Malaxis*," by H. N. Ridley, F.L.S.; "On Nuclei in *Oscillaria* and *Tolypothrix*," by Dukinfield H. Scott, F.L.S.; "Index Floræ Sinensis," Part III., by Francis Blackwell Forbes, F.L.S., and William Botting Hemsley, A.L.S.; and "On a Species of *Balanophora* new to the Japanese Flora," by Tokutaro Ito, F.L.S.

We learn with much regret that Mr. A. G. More has been obliged by ill-health to retire from his post of Curator of the Natural History Museum, Dublin. British botanists have for a long time past missed the critical notes which Mr. More was wont to contribute to our pages, more especially in the earlier days of this Journal, dating, indeed, from its first volume in 1864; and the knowledge that their absence was due to Mr. More's ill-health could not fail to evoke their sympathy. A period of long suffering has terminated in an entire incapacity for the duties of Curator, and Mr. More has been obliged to resign the post for which he was so well fitted, and which came to him as a well-earned recognition of services rendered to the Museum for many years in a subordinate capacity. We hope it may still be possible for Mr. More, in his retirement, to continue his work on the new edition of the 'Cybele Hibernica'—a book which is simply indispensable to the student of Irish botany, and which owed its critical value mainly to Mr. More's co-operation.

A NEW *POTAMOGETON*.

By Arthur Bennett, F.L.S.

Potamogeton mexicanus, sp. nov. — Rootstock creeping; stems simple? Lower leaves 3–5 in. long, alternate strap-shaped-elliptical, tapering at either end; petioles 3–5 in. long. Upper leaves 3–4 in. long, alternate (or occasionally opposite) elliptical, coriaceous; with 14–16 principal ribs, and occasionally secondary ones, which fall short of the apex and anastomose with the cross-veins; areolation distinct over the whole leaf; petioles 2–6 in. long. (Stipules decayed.) Peduncles 2 in. long, slightly thickening upwards. Fruiting spikes 1–1½ in. long, rather few-flowered.

Fruit $\frac{3}{16}$ in. long by $\frac{1}{4}$ in. broad, obliquely obovate-tricarinate, with the inner margin slightly rounded; style facial, outer margin much rounded, with the apex depressed, and its apical margin level with the beak; central margin bluntly and evenly denticulate, the outer margins strongly bossulated, with raised lines proceeding from the bosses to the central marginal edge. Embryo curved for half its length.

Mexico. "Valle de Mexico; leg. Schmitz (herb. Auerswald)," *Herb. Mus. Brit.!* "In flumine bei Chasseltepec, Aug. 1854, ex herb. W. Schnaffner, No. 199, affinis *P. natans*," *Herb. Reg. Beroliensis!*

The specimen in the British Museum Herbarium is not complete, but the fruit is exactly that of Schnaffner's plant, which is a fairly complete specimen. As yet I have found nothing like this at the Kew Herbarium.

One of the many plants with leaves very like those of *P. fluitans* Roth, many of which cannot be determined, from the absence of fruit. In this case the fruit is well developed, and is totally different from *fluitans*, being somewhat like *tricarinatus* F. Mueller, but much larger; and in *tricarinatus* the outer margins are almost winged and thin in texture, while those of *mexicanus* are thick and bossulated. Possibly some of the South American specimens wanting fruit doubtfully referred to *fluitans* may belong here.

While writing of an American species, it may be well to name a species which must, I think, cease to bear the name given to it by Prof. Tuckerman, i. e., *P. Claytonii*. Chamisso, in Linnæa, 1827, p. 227, described a plant from Willdenow's herbarium as *P. pensylvanicus* Willd. hb. n. 3192; and in Willdenow's herbarium at Berlin there are specimens named by Chamisso, and initialled by Prof. Tuckerman as his *Claytonii*, so there is no question that both are the same; and I do not see how Chamisso's name can be suppressed. Tuckerman's name bears date, 'Silliman's Journal of Science,' 1st series, v. 45, p. 38 (1843).

NOTES ON THE BOTANY OF MANITOBA.

By R. Miller Christy, F.L.S.

(Concluded from p. 276.)

Oxalis corniculata L. Macoun speaks of it as a native of the southern prairie regions, but not common. I met with it sparingly in a moist spot on the bank of the Assiniboine River at its junction with the Souris. I believe it bore cleistogamic, but not heterostyled flowers.

Polygala Senega L. Pretty common on the prairie throughout Southern Manitoba. It flowers about the end of July.

Psoralea argophylla Pursh. A common plant on the dry open parts of the prairie. I believe it is often called the "Sundial." I saw its flowers from July to the end of August. — *P. esculenta* Pursh. Common on open dry portions of the prairie. Its root (not speaking botanically) is very large, and resembles a small tapering turnip, though no part of it appears above the ground. From this it gets its name of the "Indian or Cree Turnip," because the Indians are said to eat it. On more than one occasion Mr. Thompson and myself tried to do likewise, but, whether from lack of knowledge how to cook it or the presence of better food, we found the turnip hard and almost woody, and accordingly voted it quite uneatable. It probably flowers in June. The seeds, which ripen during the early part of August, are very often destroyed by some grub. The plant has a most peculiar mode of distributing its seeds. After flowering, instead of withering away, the plant remains standing, and by the time its seeds are ripe it has become—flowers, stalks, and all—perfectly dry, brown, and rigid. In this condition it is very light. The stem then separates just below the ground, leaving the entire plant free to be blown about by the wind over the surface of the prairie, dropping its hard oval seeds as it goes. Not unfrequently the plants may be found arrested and collected together in the waggon tracks of the settlers. Towards the end of August I had the curiosity to weigh and measure five plants which were thus being blown about, with the following results :—

No.	Height.	No. of Flower-heads.	Weight.
1	7½ inches	3	13 grains.
2	7½ ,,	4	45 ,,
3	8 ,,	3	26 ,,
4	4⅝ ,,	3	19 ,,
5	5¼ ,,	3	19 ,,
Totals 5	32⅞ ,,	16	152 ,,

For the five plants, therefore, we have an average height of 6·6 inches, an average of 3·2 flowers, and an average weight of 30·4 grains, which is, I believe, light for such solid-looking plants.

Petalostemon candidus Michx., *P. violaceum* Michx. Both these are abundant in dry places on the open prairie round Carberry. They flower in the end of July and early August.

Astragalus caryocarpus Ker. Known as "the Buffalo Bean." Fairly common on the prairie in dry places. I did not see it in flower, but the large, green, succulent "beans" were of full size about the end of July. These are of peculiar structure, oval, an inch or rather more in length, and formed of two equal portions, which are easily separated. When separated each portion is found to be hollow, and to contain several small hard seeds which rattle when shaken before the outside of the bean has lost its succulent greenness and becomes brown and dry, as it afterwards does. The entrance to the cavity is on the flat side, which joins on to the other half of the bean. It is closed by a stiff membrane of the nature of a valve. It seems clear that this unusual structure is in some way intended to ensure the distribution of the seeds. It is, however, not very obvious in what way they do so, as the beans year after year remain scattered round the plant, a few being added each summer, till I have sometimes seen over a score, in all stages of decay, thus collected round a plant. From their popular name it may well be supposed that the beans were formerly a favourite food of the buffalo, and I have been assured that oxen show a great liking for them. Probably, therefore, the structure of the bean is intended to ensure the dispersion of the seeds while passing through the stomach of the buffalo. It would be interesting to know whether, now that the buffalo is exterminated, this plant will not also, in course of time, become extinct, or at least less common than formerly. Its distribution, as stated by Macoun, agrees fairly well with the ancient range of the buffalo. A gentlemen at Brandon told me that he had made the beans, whilst still green and succulent, into a pickle, which had been appreciated.— *A. canadensis* L. The prairie about Carberry. Rare. Flowers in August. — *A. adsurgens* Pall. Prairie about Carberry. Not rare. Flowers in July. — *A. monticola.* Prairie near Carberry. Not uncommon. July.

Oxytropis Lamberti Pursh. Prairie round Carberry. Not rare. July.

Glycyrrhiza lepidota Nutt. Not uncommon in moist places on the prairies, and on the edges of bluffs. I only saw the seeds. This is another plant which evidently is specialised to make use of the buffalo in the dispersal of its seeds. From Macoun's statements it may be seen that the range of the two was pretty much identical. These seeds have their pods covered with many short hooked bristles, which easily become entangled among the wool of the buffalo, and are then not easily separated from it. I found numbers of them adhering to the hair of buffalo robes that I examined when exposed for sale in Winnipeg, Brandon, and elsewhere. They were chiefly among the long hair on the chest, hump, head, and tip of the tail. With them, and on some of the robes only, were some much larger seeds, at least an inch in length, and evidently belonging to some allied species, though I

believe I never saw it growing. They were extremely prehensile, being thickly covered with stout spikes which were themselves bristly, and I noticed them nowhere except among the hair of the tail, to which they clung with such pertinacity that any attempt to extricate them tore away the hair itself.

Vicia americana Muhl. Abundant on the prairie during early July. Var. *linearis ?*. Ditto.

Lathyrus venosus Muhl. Sand-hills. Not common; it reaches a height of two feet. Various kinds of wild pea are abundant in places on the prairie, and among the sand-hills.

Chamærhodos erecta Bge. Not uncommon on the prairies round Carberry.

Spiræa salicifolia L. Common round sleughs and on the moister portions of the prairie. July and the beginning of August.

Geum rivale L. Very abundant on the open prairie in spring after the "sandflowers" are over. The seed ripens early in July.

Potentilla norvegica L. A single plant only observed near a house at Carberry on August 25th. Perhaps introduced. — *P. glandulosa* L. Fairly common on the prairie round Carberry during July and August. Macoun mentions it only as a British Columbian plant.—*P. fruticosa* L. Fairly common in sleughs and moist places near Carberry. August. — *P. palustris* Scop. Great Swamp. Scarce. Found in flower at beginning of August.—*P. pennsylvanica* var. *strigosa* Pursh. Prairies about Carberry. Uncommon. July. Macoun mentions it only as a British Columbian form.

Rosa acicularis Lindl. The Dwarf Prairie Rose. This is one of the most beautiful and most characteristic of the flowers of the prairie. It is exceedingly abundant wherever the soil is dry, flourishing even on the sand-hills, but it dislikes wet situations. Several rather remarkable galls much affect the plant. It is a profuse flowerer in July and early August. The flower is much more elegant than that of our wild English rose. Probably I am confusing under this name at least two species which hybridise freely with one another. Macoun (who has seen my specimens) admits that there is much confusion among these western roses, of which there is no monograph. The flowers vary from a lively crimson-red to an almost pure white or very pale pink, usually more or less striped and spotted with a darker pink down the centre of the petals. The tallest plants seldom attain a greater height than one foot. This is no doubt partly due to the frequent prairie fires, which annually burn its branches; it is, indeed, one of the very few prairie shrubs which are able in any degree to resist extermination by the fire. Its hips are annually roasted and scorched by the fire, which often hang upon the blackened twigs for a long time, sometimes standing up above the snow in winter. After being scorched they become extremely hard, and Mr. Thompson has observed that in the district round Carberry, where there is an entire absence of small stones and even grit, the prairie chickens (*Pediocetes phasianellus*) swallow the seeds they contain to help grind the food in their gizzards, exactly as they

would grit if they could get it. No other species of rose obviously distinct from this (or these) appears to grow on the prairie.—*R. Sayi* Schwein. A few plants (in seed) observed at one spot in a thicket among the sand-hills on July 24th. Not seen elsewhere.

Parnassia palustris L. Very abundant in sleughs, beside lakes, &c. July and early August.

Heuchera hispida Pursh. Prairie about Carberry. Rather sparingly. July.

Epilobium angustifolium L. "Fireweed," commonly so-called because, though unseen at other times, it frequently springs up in great abundance in a bluff after it has been devastated by the fire. Sometimes also in corn-fields. July.—*E. palustre* var. *lineare* Gray. Common in the Great Swamp. End of July.

Œnothera biennis L. On the prairie. Common. July.—*O. serrulata* Nutt. Very common on the prairie round Carberry in July and early August.

Opuntia Missouriensis DC. Macoun says:—"We refer all our eastern [? western] forms to this species, but without being certain, as specimens have seldom been preserved." He adds, "The Qu'appelle Valley, about two miles from its mouth, and the north bank of the Assiniboine above Shell River, are the most eastern localities known." I found it, however, fairly abundant on the sand round the highest of the sand-hills, which is some 100 miles east of the last-named locality. It was just opening its lovely sulphur-yellow flowers at the end of July.

Sanicula Marylandica L. Beside sleughs and in moist places on the prairie. Common. Flowers in June. The seeds are prehensile, and are probably intended to be dispersed in the wool of the buffalo, as the plant grows to a height of three or four feet, and there was no other woolly-haired wild prairie animal of sufficient size to entangle the seeds in its coat when held at this elevation. I have a specimen which has entangled quite a large mass of the heads of *Agrostis laxiflora*, a grass which (as elsewhere mentioned) allows its heads to be blown about the prairie by the wind.

Peucedanum fœniculatum or *sativum?* Fairly common on the prairie. July and August.

Cornus canadensis L. Common about the middle of July on the edge of the Great Swamp.—*C. alba* L. Bank of the Assiniboine at Souris mouth. August 10th. It bore very curiously-shaped berries.

Linnæa borealis Gron. Drier spots in the Great Swamp. Not uncommon. Mid-July.

Symphoricarpos occidentalis R. Br. Common on dry portions of the prairies. Flowers in July and early August. It is one of the few shrubby plants able to withstand the fire on the open prairie; it often grows in clumps on mounds thrown up by badgers or skunks, though why it does so I do not exactly know.

Galium boreale DC. (*G. septentrionale* R. & S.) Common on the prairie at the end of July.

Liatris scariosa Willd. Common on the prairie. Flowers

from the middle of August to beginning of September. A very handsome species. On August 21st I gathered a light-coloured variety in a waggon-trail. Not unfrequently I observed a large caterpillar of the "woolly bear" kind feeding on the petals of this species. It is, I believe, unusual for the petals of any flower to be eaten by insects.—*L. punctata* Hook. Also common on the prairie. It flowered in the first week of August and lasted till September.

Aster lævis L. Common on the prairie round Carberry during the latter half of August.—*A. Noræ-Angliæ* L. Beside a sleugh near Carberry on August 21st. Rather sparingly. Not seen elsewhere.—Var. *roseus* DC. With the type-form, but scarcer still.—*A. vimineus* Lam. Common on the prairie round Carberry during the latter half of August.—*A. ptarmicoides* T. & G. Common on the prairie round Carberry during end of July and beginning of August.—*A. umbellatus* Mill. Sleughs near Carberry. Scarce.

Erigeron bellidifolius Muhl. Common on the prairie round Carberry during August.

Chrysopsis villosa Nutt. Prairie round Carberry. Common. July and August.

Solidago rigida L., and another species. Both excessively abundant on the prairies round Carberry. They both came into flower abundantly about the 13th of August, and lasted until the end of the month. During this time they made a very striking show. They are both much frequented by moths, even during the daytime. Their stems are very subject to a large spherical gall. On fresh "breaking" the flower-heads sometimes are very large.

Heliopsis scabra Dunal. Rare. In a sleugh near Carberry on August 21st. Not seen elsewhere.

Echinacea angustifolia DC. Near Brandon and Souris mouth. Rather scarce. Not seen near Carberry.

Rudbeckia hirta L. Common on the prairie round Carberry in late July and early August.

Helianthus strumosus L. Rare. Seen only at one spot beside a sleugh near Carberry on August 21st. Macoun seems doubtful of its occurrence in the North-West.—*H. rigidus* Desf. Very common in July and August on the prairies round Carberry, where it is commonly known as the "prairie sunflower." On "breaking" it sometimes makes a great show.

Gaillardia pulchella. A most beautiful flower now largely cultivated in Europe. Common, during July and the early part of August, on the prairie the whole way between Winnipeg and Carberry.

Achillea Millefolium L. Common on the prairie during July and August. It often springs up spontaneously on "fire-guards."

Artemisia Ludoviciana Nutt. and *A. frigida* Willd. Prairies round Carberry. Common. August.

Cnicus undulatus Gray. Uncommon round Carberry. I saw one patch only on the prairie. August. Bees greatly frequented it.

Hieracium canadense Michx. Prairie about Carberry. Not common. In flower August 21st.

Prenanthes alata A. Gr. Sleugh near Carberry. A single plant

in flower on August 31st. Not seen elsewhere. Macoun does not record it for the prairie region.—*P. racemosa* Michx. Beside sleughs and in moist places on the prairie round Carberry. Common. In flower from the middle to the end of August.

Lygodesmia juncea Don. Among the sand-hills and on sandy parts of the prairie round Carberry. Rather scarce. Early July. It is very subject to a certain gall.

Lactuca pulchella DC. On the prairie or with crops. Uncommon. August.—*L. canadensis* L. I observed a single specimen only in a wet spot among the sand-hills on July 26th.

Lobelia Kalmii L. Certain spots in the Great Swamp. Common. In flower on August 7th. — *L. spicata* Lam. Common at one spot in a sleugh near Carberry. End of July.

Campanula rotundifolia L. Excessively abundant during July and August on the dry parts of the prairie round Carberry, to the almost total exclusion of other species of the genus.—*C. Scheuchzeri* Vill. Common.

Pyrola rotundifolia L. Fairly common at the end of July in the Great Swamp, and at one other place near Carberry. — *P. secunda* L. Great Swamp at same time. Less common.

Moneses uniflora Gray. In the Great Swamp. End of July. Scarce.

Lysimachia ciliata L. Common on the prairie near Carberry, especially in moist places, at the end of July.—*L. thyrsifolia* L. Edge of the Great Swamp on July 26th. Scarce.

Utricularia vulgaris L, Common in most of the lakes among the sand-hills. Flower at end of July. — *U. intermedia* Hayne. Abundant on Sept. 17th in some tiny pools of water, each about two inches deep, on a level grassy swamp beside Pine Creek. Not seen elsewhere. — *U. minor* L. In a small pond among the sand-hills. Not observed elsewhere.

Aphyllon Ludovicianum Gray. Rare. On August 10th I found one or two specimens growing in pure sand among the sand-hills beside the Yellow Quill Trail, a few miles north of Souris-mouth. Not seen elsewhere.

Pentstemon pubescens Sol. Prairies, Carberry. Not rare. July. Macoun gives no localities for this species in the prairie region.

Castilleia miniata Dougl. Common in the moist district about thirty miles east of Carberry, but I only once saw it near Carberry itself. July. A very showy plant when growing in masses.—*C. coccinea* Spreng. Common in a sleugh near Carberry at the end of July.

Orthocarpus luteus Nutt. Common on the prairie about Carberry. Early in August.

Pedicularis canadensis L. Sloughs and moist places. Not common. Early August.

Monarda fistulosa L. (var. *mollis?*). Very common on the prairies round Carberry late in July and early in August. It is a favourite with the butterflies. A proliferous variety, having two flowers, one raised above the other upon a stalk about half an inch long, is not uncommon.

Lophantus anisatus Benth. Common during July on the prairies round Carberry, especially wherever the ground has been disturbed. It is much frequented by humble bees.

Lithospermum canescens Lehm. Very abundant on the prairie during May and June. I have already published some notes upon its heterostylism (Journ. Bot. 1885, p. 60).

Solanum triflorum Nutt. Not observed commonly. In the beginning of August I saw a few plants at Carberry, and others on the railroad at Douglas.

Physalis grandiflora Hook. Rare. On August 7th I saw two plants in flower on the edge of the Great Swamp, but none elsewhere.

Gentiana Andrewsii Griseb. Rare. Macoun does not record it from the North-West. I saw a few plants in a moist spot at the edge of a bluff near Carberry early in September.—*G. crinita* Froel. Common in the sleughs round Carberry during August.—*G. affinis* Griseb. Very abundant on the prairies round Carberry, where, (though unnoticed at other times) it makes a great show during a short period of the year, namely, during the first three weeks of September, as already noticed. — *G. Amarella* L., var. *acuta* Hook. Rather common in sleughs near Carberry during the last two weeks of August.—*G. serrata* Gunn. Rather uncommon. Sleughs near Carberry, and the bank of the Assiniboine at Souris-mouth, August.

Chenopodium album. An introduction from Europe, but one probably introduced at a very early date. It springs up abundantly on disused trails, round settlers' houses, &c., and is commonly known as "Pigweed." Its leaves are sometimes cooked and eaten by settlers. I have tried them, and found them not a bad substitute for spinach. Alex. Ross records ('Red River Settlement,' p. 23) that Lord Selkirk's starving settlers fed on it as long ago as 1812.

Blitum Bonus-Henricus Reich. Scarce. I only saw it at one or two spots, one of which was among the sand-hills on July 26th. The Indian squaws are said to obtain from the bright red tops a dye with which they colour the moose hair and grass which figures in their ornamental work: hence it is sometimes called "squaw root."

Eleagnus argentea Pursh. Common on the drier portions of the prairies. It is one of the few shrub-like plants at all able to withstand the fires. In places protected from the fire it will sometimes attain a height of six feet, but on the open prairie it seldom exceeds two or three. It is commonly called "Wolf Willow," "Dog's Willow," or "Silver-leaf," the latter because of the very peculiar pale silvery-green colour of the leaves, which are quite unlike those of any other plant. The skin of the berries is of the same colour. It contains a quantity of a fine, brown, powdery substance, within which is an excessively hard stone. There is a large caterpillar of a moth (*Platysamia Columbia-nokomis*) which feeds upon the leaves of this plant, and is of exactly the same colour as they, thus affording a remarkably obvious instance of protective colouring.

Urtica gracilis Ait. Rare. I found a few plants beside Pine Creek on September 17th. Not seen elsewhere.

Quercus alba L. Very common on the sand-hills and in the bluffs on the prairies. It is a scrubby species, and seldom exceeds thirty feet in height, bnt yields very hard wood. I saw no other species of the genus in Manitoba.

Juniperus virginiana L. Known as the "Ground Juniper." A characteristic and abundant species among the sand-hills and on sandy portions of the prairie. Were it not for this plant, large areas of the sand would be perpetually shifting with the wind. The juniper covers the ground as with a dense carpet, which often extends over many square yards together. Its branches never rise more than two or three inches above the ground, but run along its surface, crossing and recrossing one another, and throwing out smaller branches, which prevent the sand from drifting. When such a patch takes fire the smaller twigs are burned, while the larger ones are left upon the ground and look much like so many charred ropes. A useful list of the trees growing in Manitoba, by Dr. Robert Bell, will be found in the first (1882) 'Report of the Department of Agriculture of the Province.'

Calla palustris L. Common at spots in the Great Swamp. The flowers were over at the end of July.

Spiranthes Romanzoviana Cham. Common on a piece of level, grassy, swampy land beside Pine Creek on September 17th. Not seen elsewhere.

Habenaria dilatata Gray. In the Great Swamp on July 26th. Rather scarce.

Cypripedium spectabile Sw. In the Great Swamp, rather sparingly; at same date also in a wet bluff beside the railway near Portage-la-Prairie.—*C. parviflorum?* Sw. Common on the prairie throughout Southern Manitoba in May.

Sisyrinchium anceps Lam. This plant has a most elegant little star-like flower of the deepest blue. It closes soon after being gathered. I saw it abundantly on the prairie in many places, both in Manitoba and Minnesota, at the end of June and early in July.

Zygadenus glaucus Nutt. Common on the prairie round Carberry from the middle to the end of July.

Tofieldia palustris Huds. In the Great Swamp. In flower not uncommonly on July 26th.

Tovaria trifolia Neck. Edge of the Great Swamp. Not uncommon. Nearly over on July 26th.

Lilium Philadelphicum L. A most characteristic and abundant species during a short portion of the summer. Early in July its flowers are so numerous round Carberry that they literally tint the prairie when seen from a distance. I only saw the very end of the show. It is known as the Orange, Tiger, or Yellow Lily.

Allium mutabile Mich. Common among the sand-hills and on sandy portions of the prairie about the middle of August.

Scirpus atrovirens Muhl. Sleughs near Carberry, August.

Carex ampullacea Good. Sleughs near Carberry, August.—*C.* ————*?* On the sand-hills. Common. Like the juniper, it doubtless assists in keeping the sand from shifting. The plant

sends out roots which run along often for a yard or more, perfectly straight, just below the surface of the sand, and send up a small tuft of grass-blades about every two inches.

Eriophorum triquetrum Hoff. In the Great Swamp, sparingly.

Agrostis laxiflora Richards. (= *A. scabra* Willd.). Abundant. It often grows in large patches, and generally it is the first species to spring up on old disused cart-trails. During August the heads break off at one of the joints of the stalk, and are driven about the prairie by the wind, doubtless to distribute the seed. After a high wind it may sometimes be found clinging to fences or trees; and I have a specimen of *Sanicula Marylandica*, gathered as it grew in a sleugh near Carberry, which has collected, by means of its prehensile seeds, quite a large mass of the heads of this grass.

Stipa spartea Trin. A most characteristic Manitoban plant, growing abundantly on the drier portions of the prairie. Whilst in seed it is impossible to overlook it, as it runs its sharp seeds through one's clothing and into one's legs; hence its common names of Wild Oat, Spear Grass, Oat Grass, Go-Devil-Oat, Buffalo Grass, &c. In former times it probably depended largely upon the buffalo for the distribution of its seeds. Roughly speaking, the ranges of the two in North America were identical. The leaves of plant form tussocks, and are second to none growing on the prairie in their value as forage. All animals are especially fond of them. During the early part of the summer each plant throws up several stalks, each about 2 ft. in height, and each bearing six or seven "spears," which ripen during July. The length of these oat-shaped spears is about $\frac{7}{8}$ in. At one end they have an excessively hard and sharp, and slightly twisted point, surrounded by fine barb-like hairs, pointing backwards; at the other end the seed is produced into a straight but twisted awn or shaft, often nearly 2 in. in length. Then comes a bend, which may be called the "lower knee"; then a nearly straight portion for half an inch or less; next a second bend or "upper knee"; and, finally, a fine tapering bristle or "arm" set with many minute teeth. The entire contrivance has a hygroscopic action exactly like that described by Dr. Francis Darwin in the case of *S. pennata* (Trans. Linn. Soc. (Bot.) 1876). When dry the shaft is sharply twisted, having made eight or nine revolutions; the two knees are bent, and consequently the arm forms a right angle or thereabouts with the shaft. But when wetted the shaft begins rapidly to untwist, the two knees become obliterated, and the whole contrivance becomes perfectly straight and untwisted. The power of twisting and untwisting seems to last for an indefinite number of times. I made many observations as to the rate at which the awns twisted when drying, or untwisted after being wetted. On an average each awn in untwisting made about eight revolutions, occupying altogether about seventy-four minutes; the quickest being the second or third, and the slowest the sixth or seventh. In retwisting the time occupied was rather longer. Heat greatly accelerates both the twisting and untwisting of the awns. The following tables show in detail the result of my observations on five different awns:—

UNTWISTING.

No.	Time occupied by Revolutions in Minutes.									Total Time occupied.	No. of Revolutions.	Average Length of Revolutions.	Longest Revolutions.	Shortest Revolutions.
	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.					
A	9	7	7¼	7¾	9	18	16	(¼)	—	74	7¼	11	6th—18	2nd—7
B	10	6½	6½	7	11	19	14	(⅓)	—	74	7⅓	11	6th—19	2nd & 3rd—6½
C	12	9	8	9	9	11	16	(⅓)	—	74	7⅓	11	7th—16	3rd—8
D	7½	5	5	4½	5½	5½	25	15½	(⅓)	74	8⅓	9	7th—25	4th—4½
E	9½	7	7	8	7	3	16	16	(⅔)	74	8⅔	9	7th & 8th—16	6th—3
RE-TWISTING.														
A	20	8½	9½	15	23	(¾)	—	—	—	76	5¾	13	5th—23	2nd— 8½
B	20	7	11½	16½	21	(¾)	—	—	—	76	5¾	13	5th—21	2nd— 7
C	14	16	12	18	16	(½)	—	—	—	76	5½	13	4th -18	3rd—12
D	10	6½	10½	8	9	23	9	(¼)	—	76	7¼	11	6th—23	2nd— 6½
E	20	19	16	20	½	—	—	—	—	75	4½	16	1st & 4th—20	3rd—16

There can be very little doubt that this hygroscopic action of the awns is intended to drive the point of the seed either into the ground or some other substance. For this it is admirably suited. Supposing an awn in a dry state to fall among the grass and there to become wetted; the arm, being at right angles to the axis of revolution, catches among the grass and thus occasions the revolution of the sharp point of the seed. As the knees gradually become obliterated the arm rises from its first position, and its teeth, catching among the grass, afford a pressure on the sharp revolving tip of the seed, which drives it forward, and causes it to penetrate any sufficiently soft substance opposed to it. When the awn dries again the barb-like hairs round the tip prevent its being withdrawn, but they offer no resistance to further penetration when the whole contrivance once more happens to be wetted. Thus we have an automatic natural boring apparatus of the most perfect kind. Probably, however, it is intended to penetrate the skins of woolly-haired animals rather than the ground, as the very fine teeth would be much more effective among wool than grass. The fact that these seeds have the power of penetrating the skins of animals does not seem to have been previously recorded, and some good botanists to whom I have communicated it have been sceptical; but I was able to obtain conclusive evidence of it from numerous settlers and others that I came in contact with. Probably the seeds formerly bored into (they could hardly bore *through*) the skins of the buffaloes, and, after being carried long distances, were dropped along with winter coats of those animals. Many buffalo-robes, however, which I searched contained none, but these may have been obtained at a wrong time of year. Other seeds, as already pointed out, were certainly distributed by the buffaloes. Now the buffaloes are gone, but sheep and woolly-haired dogs still suffer very severely from the "spears." One man told me of a collie dog that had learned never to go among the grass when the spears were ripe; another of a spaniel he had shot because of extensive ulceration caused by the spears all over the breast and stomach;

and another of a collie that had its hair close-cropped, and was found to be covered with sores. Quite a number of butchers with whom I spoke in Winnipeg, Brandon, Portage-la-Prairie, and elsewhere, were perfectly familiar with the power of the seeds to penetrate the skins of sheep, and said they had often seen them embedded in the flesh just beneath the skin, chiefly about the shoulders. I frequently heard of cases in which sheep had been killed by the action of the spears, and, though I never actually saw a case, have little doubt they were to be relied upon. One gentleman informed me he had had a lamb which was so much hurt by the spears that it would certainly have died had he not killed it. Most of my informants were agreed that, although sheep flourished well on the prairies, they would suffer from the spears, unless such precautions were taken as folding them during the time the seeds were ripe or cutting down the flower-stalks before the seeds developed. After my return to England I placed several awns, by way of experiment, among the wool of two of our own sheep. In eleven days all had penetrated the skin to a distance of half an inch, when I discontinued the experiment. The power of the seeds of *Stipa spartea* to penetrate skins of animals can therefore no longer be denied.

Stipa comata Trin. I also experimented with some awns of this species, which I gathered on the 14th of October last at Beaver Creek, near Fort Ellice, Manitoba. This species is by no means abundant in the country, and appears to be restricted to the most sandy tracts, flourishing even on the sand-hills, which are of such pure sand that they are almost bare, even of grass. The awns are small and delicate. The seed measures only five-sixteenths of an inch in length, and is provided with but a weak point. The twisted portion of the awn or "shaft" is just $\frac{3}{4}$ in. in length; the two knees are distinct, and just $\frac{1}{4}$ in. apart; the arm is a slender, tapering filament, no less than $\frac{3}{4}$ in. in length, and having usually a double curve, the tip turning upwards. It seems probable that the slenderness and smallness of the awn is due to the fact that there is no necessity for it to be stronger, as the excessively fine sand upon which it grows is very easily pierced; while the unusual length of the arm, in proportion to the shaft, would give it a better chance of catching against some of the few surrounding stalks of grass. The following figures show the result of immersing four awns in water at a temperature of 50° F. The awns, however, seemed to be so sensitive and began to uncoil with such unexpected rapidity that I was taken by surprise, and fear that I did not record their movements with absolute correctness. In the case of D the seed had been broken off, so that only the awn remained, and this, as I have had other occasions of observing, has a tendency to lessen the number of revolutions. In recoiling D made no movement for 23 minutes after being taken out of the water, but upon being stuck into a dry piece of cork it completed a revolution in $8\frac{1}{2}$ minutes, as shown in the table :—

UNTWISTING.

No.	Time occupied by Revolutions in Minutes.									Total Time occupied.	No. of Revolutions.	Average Length of Revolutions.	Longest Revolutions.	Shortest Revolutions.
	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.					
A	2	1¼	1¾	1½	2½	3	12	(¾)	—	24	7¾	3½	7th—12	2nd—1¼
B	2	1	¾	1	¾	1½	3	14	(¼)	24	8¼	3	8th—14	3rd— ¾
C	2	1¼	¾	3	2½	14½	(½)	—	—	24	6½	4	6th—14½	3rd— ¾
D	3	1	3	7	10	(¼)	—	—	—	24	5¼	5	5th—10	2nd—1
RE-TWISTING.														
A	9	3	3¼	3½	10	32	(½)	—	—	61	6½	10	6th—32	2nd—3
B	11	3	4	8	35	—	—	—	—	61	5	12	5th—35	2nd—3
C	7	6	6	16½	25½	(⅔)	—	—	—	61	5⅔	12	5th—25½	2nd & 3rd—6
D	8½	4½	10	15	(¾)	—	—	—	—	38	4	9	4th—15	2nd—4½

Spartina polystachya Willd. Sleughs near Carberry, Brandon, &c. A tall and remarkably stout and stiff species, known as "Bone Grass."

Bromus Kalmii Gray. Common in sleughs round Carberry at the end of August.

Hierochloa borealis R. & S. Near Portage-la-Prairie. Not seen near Carberry. This is the "Scented Grass" of which the Indian squaws make fancy-work.

Andropogon furcatus Muhl. Common in sleughs, August.

Equisetum sylvaticum L. Common, in August, in a moist bluff near Carberry. Not seen elsewhere.

Botrychium ternatum Sw., var. *lunarioides* Willd. On the prairie round Carberry at the end of August and early in September. The entire absence from the prairie region (so far as I saw) of all the Filices, except this, is very noticeable. There are many species in the rocky forest region round the Lake of the Woods.

Lycopodium complanatum L. Port Arthur, Lake Superior.

Selaginella rupestris L. Sand-hills. Scarce, July.

Philonotis fontana Brid. Bank of the Assiniboine at Souris-mouth. Abundant on August 10th.

THE PERMANENCY OF SPECIFIC NAMES.

By Edward Lee Greene.

The whole subject of the fixity of scientific names is now receiving something of that attention which it ought to have commanded at least a hundred years ago. All who are at present engaged in any kind of work involving occasional change in the generic status of species are naturally, at this juncture, interested in everything said or done by others bearing on this topic.

The author of the prospective new Index of the names of plants has lately given the readers of this Journal an instructive article

upon the progress of that work, and its methods as regards nomenclature. There is at least one mode of procedure announced which I believe many phytographical writers will deeply regret. I refer to the following statement:—"Our practice is to take the name under which any given plant is first placed in its true genus as the name to be kept up, even though the author of it may have ignored the proper rule of retaining the specific name, when transferring it from its old genus to the new." In the few comments I would make on this practice I shall not offer any argument for the permanency of specific names. That they ought to be fixed and unalterable, making an exception, as I suppose, of those cases where a change is needful in order to avoid the duplication of a name in a genus, is freely conceded in the passage quoted. And it is in the admitting this and yet allowing the contrary practice that the weakness of the position lies. What consistency is there in protesting that men ought to retain the old names, and yet everywhere seconding and approving their rejection of them? It has always appeared to me very strange that the several quite eminent authorities who have accepted the proposition as above did not each discover, and find himself repelled by, the bad logic of it; and if a point of justice or injustice to authors of specific names be admitted, one must also say, the loose ethics of it. Assuredly he who is prepared to say that the "rule" demanding retention of specific names in the transference of them from genus to genus is a "proper" one, should be ready to support that rule in his own practice. He must, in truth, be held as violating it in each instance where he approves and copies the infraction of it by another.

It is paying but a poor compliment to the dignity of Science to suppose that her interests may truly be subserved by our working, even for a day, along illogical or unethical lines. It is easy to foresee that this evasion of the responsibility of insisting on the restoration of old specific names where they have been rejected, will only prolong this trouble-making era of mutability. The manifest evil tendency of the method in question is seen in this, that under it, people who like to change names in transferring species are without effectual reprimand or check of any kind. To quietly say to such authors that they ought not to do so will avail nothing; but let others who respect the rule which makes for fixity follow them up with the rejection of their newly-coined names, and the restoration of the old ones, and a few years will put an end to the abuse. Far wiser will it be to make, just now, a few more synonyms, or even many, and just as many as the recklessness of individuals gives occasion for, in this way, when by so doing we shall give character to the rule which they disrespect, and which they will never respect so long as other authors copy their infractions of it.

One is not well able to see how the kind of practice here contended for is "more likely to be the offspring of vanity than of a sincere desire to promote science." Is not vanity more likely to find more congenial occupation in making new and supposedly improved names than in adopting the ready-made ones? There

will surely be plenty of cases in which the keeping of an old one would give him who transfers, and by transferring adopts it as his own, an almost heroic exercise in humiliation, if he were not released from responsibility by a sense of obligation to use the badly-chosen or ill-constructed name.

But this allusion to motives is rather aside from the question of whether old specific names ought or need not to be preserved. If really they ought to be kept, then all authors would seem bound, in so far as it lies in their power, to practise the retaining of them. If, on the other hand, the rule for keeping them is of doubtful expediency, there is no need of calling it a rule; and every botanical writer who will may return to the irresponsible and easy method of eminent authors of three or four score years ago, who in serene complacency rejected old names and made new ones, each according to his own fancy. Between their practice and that of those who, in deed as well as word, contend for fixity by priority, there appears to me no middle way which at all commends itself to reason or augurs future good to science.

A SYNOPSIS OF *TILLANDSIEÆ*.

By J. G. Baker, F.R.S., F.L.S.

(Continued from p. 281).

89. **Tillandsia goniorachis,** n. sp. — Leaves lanceolate-acuminate; dilated base ovate, 3 in. long, 1½ in. broad; blade nearly a foot long, ¾ in. broad at the middle, tapering gradually to a short convolute point, rigidly coriaceous, densely finely persistently lepidote on both surfaces. Peduncle as long as the leaves; bract-leaves crowded, with long coriaceous linear-convolute points. Inflorescence a moderately dense spike a foot long, with a stout glabrous very flexuose rachis; flowers ascending, 12–15 on a side; flower-bracts broad-ovate, coriaceous, glabrous, ¾ in. long and broad. Calyx an inch long; sepals broad, glabrous, obtuse, much imbricated. Corolla not seen.

Hab. South Brazil, *Glaziou* 15471! 16462! Very distinct.

90. **T. micrantha,** n. sp. — Leaves 12–20 in a rosette, a foot long, linear-lanceolate from an ovate base 2–3 in. long, 1½ in. broad; blade moderately firm in texture, thinly lepidote, ½ in. broad at the middle, spotted with purple, not setaceous at the apex. Peduncle slender, much shorter than the leaves; bract-leaves small, ovate, adpressed. Inflorescence a lax panicle, with 6–8 ascending spikes 1–2 in. long; branch-bracts small, lanceolate; flowers 6–12 on a side, erecto-patent, with a space between each; flower-bract ovate, ⅙ in. long. Calyx as long as the bract; sepals obtuse. Corolla not seen. Capsule cylindrical, ½ in. long.

Hab. Trinidad, *Fendler* 818! Near *T. parvifolia* R. & P.

91. T. PARVIFOLIA Ruiz et Pavon, Fl. Peruv. iii. 41, t. 269; Roem. et Schultes, Syst. Veg. vii. 1218. *Platystachys parviflora*

Beer, Brom. 88. *Pogospermum parviflorum* A. Brong. in Ann. Sc. Nat. 5, i. 329.—Leaves densely rosulate, a foot long, lanceolate-acuminate from an ovate base, ½ in. broad at the middle, thin in texture, thinly lepidote. Peduncle slender, above a foot long; bract-leaves small, distant, entirely clasping. Panicle lax, 6–9 in. long; spikes moderately dense, ascending, 1–1½ in. long, ⅓ in. diam., lower forked; flower spreading, upper only contiguous; flower-bract oblong, green, naked, ⅙ in. long. Calyx as long as the bract. Petals small, oblong. Capsule cylindrical, 3–4 times the length of the calyx.

Hab. Peru; Andes of Muna, *Pavon*! Chacapoyas, *Matthews*!

92. T. MULTIFLORA Benth. Bot. Sulphur, 174. — Leaves lanceolate-setaceous, above a foot long, an inch broad at the base, ½ in. at the middle, rigidly coriaceous, finely persistently lepidote on both surfaces. Peduncle stout, a foot long; bract-leaves crowded, with long free erect setaceous points. Inflorescence an ample panicle 9–12 in. long; lower branches copiously compound; spikes at most an inch long, ½–⅝ in. broad; flowers close, rather ascending; flower-bract ovate, naked, ⅛–⅙ in. long. Calyx glabrous, ¼ in. long; sepals oblong, minutely cuspidate. Capsule cylindrical, ½ in. long.

Hab. Guayaquil, *Pavon*! *Sinclair*! *Edmonstone*! Columbia, *Cuming* 1249! Trees near Machala, *Barclay* 524! Allied to *T. parviflora* R. & P.

93. **T. dasyliriifolia,** n. sp. — Leaves linear-subulate, very thick and rigid in texture, a foot long, ⅓ in. broad low down, tapering gradually to the point, obscurely lepidote; veins of face close and distinctly raised. Inflorescence compound; branches of panicle ½ ft. long; rachis flexuose, naked; flowers 8–10, ascending; flower-bracts ovate-oblong, obtuse, rigid, naked, ⅝ in. long. Calyx ½ in. longer than the bract. Petal-blades oblong, convolute, violet, ½ in. long. Stamens and style protruded beyond the tip of the petals.

Hab. Holbox Island, Bay of Honduras, *Gaumer*! Received from F. D. Godman, F.R.S., in. Aug., 1886.

94. T. AURANTIACA Griseb. in Gott. Nacht. 1864, 16. — Leaves lanceolate-setaceous, coriaceous, persistently lepidote, shorter than the stem. Inflorescence panicled; spikes remote, recurvato-patent; flowers about 8, subremote; branch-bracts ovate, orange-yellow, 1½–2 in. long; rachis rufo-villose; flower-bracts broad-ovate, subacute, lepidote, shorter than the calyx. Sepals obtuse, pubescent, ½ in. long.

Hab. Mountains of Venezuela, *Fendler* 2575. Habit of *T. parviflora* R. & P.

95. T. STRAMINEA H. B. K. Nov. Gen. i. 292; Roem. et Schultes, Syst. vii. 1217. *T. scoparia* Willd. Herb. No. 6332. *Platystachys scoparia* Beer, Brom. 265. — Whole plant 1½–2 ft. high. Leaves linear-subulate, rigidly coriaceous, 8–9 in. long, argenteo-lepidote. Peduncle longer than the leaves. Panicle short, oblong, 3 in. long; spikes lax-flowered, alternate; flower-bracts oblong-lanceolate, glabrous, pale lilac, ½ in. long. Petals white, with a violet tip.

Hab. Mountains of Peru, near Loxa, *Humboldt*. Not seen.

96. **T. subimbricata,** n. sp.—Leaf with an ovate dilated base,

3 in. long, 2 in. broad; blade 2–2½ ft. long, lanceolate, an inch broad above the base, rigidly coriaceous, thinly finely lepidote, tapering gradually into a long setaceous point. Peduncle 2 ft. long; lower bract-leaves with long free points; upper short, entirely adpressed. Inflorescence a lax panicle 1½ ft. long; spikes 12–20, moderately dense, ½ in. broad, 6–8 in. long, lateral ascending; branch-bracts small, lanceolate; flowers about 12-jugate, all ascending; flower-bracts oblong-lanceolate, acute, subglabrous, ¾ in. long, ¼ in. broad. Calyx reaching nearly to the tip of the bract. Corolla not seen.

Hab. Trinidad, *Fendler* 816!

97. T. VALENZUELANA A. Rich. in Sagra Fl. Cub. iii. 267. *T. laxa* Griseb. Flora Brit. West Ind. 596, non Gott. Nacht. 1864, 18. — Leaves densely rosulate; dilated base ovate, 1½ in. broad; blade lanceolate-setaceous, 1½ ft. long, ½ in. broad low down, tapering gradually into a long setaceous point, rigidly coriaceous, thinly finely lepidote. Peduncle much shorter than the leaves; bract-leaves with erect free lanceolate-acuminate points 6–9 in. long. Spikes many, forming a panicle 6–8 in. long, moderately dense, 2–4 in. long, ½ in. broad, the side ones erecto-patent; flower-bracts oblong-lanceolate, subglabrous, ¾–1 in. long, ½ in. round. Calyx a little shorter than the bract. Petals violet, ¾–1 in. longer than the calyx, convolute in a cylindrical tube. Stamens and style much exserted. Capsule nearly an inch long.

Hab. Eastern Cuba, near Monte Verde, *Wright* 1516! Jamaica, near Manchester, *Wullschagel, teste Grisebach.*

98. T. VARIABILIS Schlecht. in Linnæa, xviii. 418. *Phytarhiza variabilis* E. Morren in Belg. Hort. 1879, 370.—Leaves lanceolate-subulate; dilated base 1–1¼ in. diam. Inflorescence simple or little branched; flower-bracts oblong-lanceolate, naked, ¾ in. long. Calyx rather shorter than the bract. Petal-limb as long as the calyx. Stamens and style as long as the petals. Capsule an inch long.

Hab. Mexico; Papantla, *Schiede.* Habit of *T. cærulea*, H.B.K.

99. T. CÆRULEA H. B. K. Nov. Gen. i. 291; Roem. et Schultes, Syst. Veg. vii. 1209. *T. squamulosa* Willd. Herb. No. 6329. *Diuphoranthema squamulosa* Beer, Brom. 266.—Leaves densely rosulate, linear-subulate, 4 in. long, channelled down the face, densely argenteo-lepidote. Flowers about 7, arranged in a lax simple spike 2–3 in. long; flower-bracts oblong, acute, lepidote, ½ in. long. Calyx shorter than the bract. Petal-limb as long as the calyx.

Hab. Mexico; banks of the River Macara, and near Sochipala and Sopilote, *Humboldt.*

100. **T. Grisebachii,** n. sp. *T. cærulea* Griseb. in Gott. Nacht. 1864, 14, non H. B. K. — Leaves densely rosulate, linear-subulate, channelled all down the face, ½ ft. long, ¼ in. broad at the clasping base, rigidly coriaceous, densely persistently lepidote. Peduncle shorter than the leaves; bract-leaves few, with long erect setaceous free points. Inflorescence a short few-flowered lax simple spike; flower-bracts oblong-lanceolate, acute, an inch long. Calyx reaching nearly to the tip of the bract.

Hab. Mountains of Venezuela, alt. 3000 ft., *Fendler* 1533!

101. T. HEPTANTHA Ruiz et Pav. Fl. Peruv. iii. 41; Roem. et Schultes, Syst. Veg. vii. 1204. *Platystachys heptantha* Beer, Brom. 80, 264. — Leaves linear-subulate, rigidly coriaceous, densely lepidote. Peduncle a foot long. Flowers about 7 in a simple lax spike; flower-bracts oblong-lanceolate, violet. Petals white, with a violet tip. Capsule oblong-trigonous.

Hab. Peru, at Tarma and Huanuco. Not seen.

(To be continued.)

NOTES ON PONDWEEDS.

By Alfred Fryer.

6. On Land-forms of Potamogeton. — The hot summer of this year, with its deficient rainfall, quite dried up the shallower ditches and ponds around Chatteris, and also heated the waters of the deeper drains to an unusual temperature. Hence on the mud of the dry ditches there has been an extraordinary growth of land-forms of Potamogetons, as well as an abundant development of their coriaceous floating leaves in those stations which remained submerged.

The true *land-form* of a *Potamogeton* is a shoot which grows in the open air after the plant has been left entirely uncovered by water. This shoot springs from a rootstock or stolon which is usually some depth below the surface, and must not be confounded with subaërial growths, which sometimes occur on branches originally formed under water. It is generally reduced to a tuft of leaves growing at the apex of an underground stem; but sometimes this stem grows some inches high above the surface of the mud, when it is erect, simple, or rarely with one or two short lateral branches. It cannot produce flowers, but continues the life of the individual plant by producing a stolon terminated by one or more bead like tubers.

Land-forms, as a rule, are only produced by those species of *Potamogeton* which are naturally inhabitants of shallow moorland pools, or of situations which are liable to a diminution or total loss of water during the summer months. It is evident that a species unable to make some degree of growth under such circumstances must soon cease to exist in the event of a succession of dry summers, or only occur from time to time, casually, when re-introduced from more favoured localities. This is exactly what does take place in the case of such deep-water forms as *P. lucens* and *P. perfoliatus*, which are occasionally found growing intermixed with the usual inhabitants of quite shallow waters, but obtain no permanent foothold in such localities.

The species of *Potamogeton* which are enabled to resist occasional drought, and to grow exposed to the free air and hot sunshine, all belong to the section of the genus which is characterised by the power (not always exercised) of producing coriaceous floating-leaves. The land-forms of this section, hitherto but little observed, offer valuable suggestions on the alliances and specific limits of the

forms of the genus, and well deserve a more careful examination than they have hitherto received. Although they have been so abundant in the fens this summer as to force themselves on the notice of the field-botanist, they require looking-for in ordinary seasons; still, as they are annually produced to some extent, they may be subjected to the continuous and patient observation which the accurate solution of problems in Natural History demands.

The species which grow in the fens, and which form the subject of this note, are *P. natans*, *P. fluitans*, *P. plantagineus*, *P. heterophyllus* and its allied forms *P. varians* and *P. nitens?* (an undescribed form), with the closely related *P. Zizii* and its form *P. coriaceus*, and *P. lucens*. The last of these and *P. fluitans* generally inhabit deep water, and *P. plantagineus* is rarely found in water over two feet deep; the rest are, as far as the recognised *species* go, inhabitants of both deep and shallow water alike.

P. natans L.—Land-form very robust, no stem above the surface of the ground; leaves forming a tuft, lower linear, reduced to a thickened midrib, *subpersistent*, *always longer than the upper leaves*, and *always produced;* the secondary, or upper leaves in position, are densely coriaceous, broader in proportion to their length than those of the ordinary water-form, slightly auricled at the base when dry, and *showing no trace of the characteristic joint*. Lower leaves 2–4 in. long by 1-12th in. broad; upper leaves oval to suborbicular, petiole $\frac{1}{2}$–$1\frac{1}{2}$ in. long, lamina $1\frac{1}{2}$–$2\frac{1}{2}$ in. long by 1–2 in. broad. As *P. natans* in its normal state retains many of its upper leaves all through the winter, the land-form probably grows until checked by frost, or converted into the ordinary state by being submerged by the return of the water.

P. fluitans Roth.—The land-form of this plant is clearly distinct from *P. natans* on the one hand, and *P. Zizii* on the other—the two species which *fluitans* most closely resembles in its perfect state. The lower leaves are reduced to two or three, narrowly linear, 1-12th in. broad by 2–3 in. long; the *lamina is always present*, but longitudinally folded, so that the whole leaf looks like the ordinary "phyllodes" of *P. natans*, or of *P. Zizii*, as they occur in the land-forms of those species; the upper leaves spring from an erect unbranched stem 1–2 in. high,—like that of the land-form of *P. Zizii*, only much dwarfer and more slender,—petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long, lamina 1–2 in. long by $\frac{1}{2}$–$\frac{3}{4}$ in. wide, elliptical-oval or suborbicular, gradually narrowed into the petiole, very thinly coriaceous; base of leaves, petioles, and stem tinged with pinkish crimson.

As *P. fluitans* is a deep-water plant in all its natural stations in the fens, I have not had the opportunity of observing its land-form in a perfectly wild state. A pond in which I planted a root of it some time ago having, however, become quite dry in the middle of July, I have been able to watch the land-form for some weeks; it is of slender and delicate growth, though plentifully produced, and conveys the idea that the plant seldom has occasion to resort to this mode of existence. From the resemblance of the two species in their ordinary state it will probably continue to grow on like that of *P. natans*. It is quite distinct from any land-form known to me, although it has certain superficial resemblances, as pointed out above.

P. plantagineus Ducros. — This species is much dwarfed in the land-form, but in other respects it remains so little altered from its ordinary state that no special description is required. The leaves are remarkable for remaining membranous and translucent, in this respect resembling certain leaves of *P. varians*, noticed later on. After protracted drought the tufts come feebly, something in the way of those of *P. fluitans*, and perhaps the leaves of these later-produced examples are slightly more coriaceous. The land-form of this species seems to stand apart with that of *fluitans* in never producing lower leaves reduced to a thickened midrib.

P. heterophyllus Schreb. — This species not only throws up land-forms from the buried stolons, but its already produced subaqueous branches are able to survive the total deprivation of water. When left quite dry in an immature state of growth, however, the already formed leaves usually perish, and are succeeded by little rosettes of leaves at each joint of the branches. This is also a feature in the allied forms hereafter mentioned under the names of *P. varians* and *P. nitens?*

I have seen flower-spikes produced on these branches in *P. heterophyllus* when the plant has been growing for some time in the free air, but have not met with any that have perfected fruit in this condition. It seems quite possible that in damp situations fruit might be ripened, in which case alone could we call a *Potamogeton* truly amphibious.

The leaves of this and the succeeding members of the *heterophyllus* group are so variable that it is useless to attempt to give a detailed description of them at present—each form presents a peculiar facies, and will require a few general remarks; but until their usual aquatic states have been fully worked out it would be misleading to enter into minute details. These imperfectly-known forms I assign with more or less certainty to *P. varians* Morong!, and its supposed variety or state, *P. spathæformis* Tuckerman; and an undescribed variety or species, which is curiously intermediate between *P. nitens* and *P. heterophyllus*, to *P. nitens* Web.(aggregate). These three forms or species of *Potamogeton* seem to be links between *P. heterophyllus* and *P. nitens* on the one hand, and *P. heterophyllus* and *P. Zizii* on the other. With the last they are connected by a form which seems to be *P. coriaceus* Nolte.

P. varians Morong (*in litt.*). — This plant is considered by the Rev. T. Morong to be identical with the American plant so named. In its subaërial state it certainly is the most remarkable *Potamogeton* known to me in its power of resisting extreme drought and heat. I have gathered healthy plants of *P. varians* (on the bottom of a perfectly dry ditch exposed to the full rays of the sun) the leaves of which were covered with dust and ashes blown from an adjacent "burning-ground," and yet the lower leaves were as thin and translucent as those of *P. plantagineus*. In another instance this species grew on the bottom of a grassy ditch,the herbage of which was cut and made into rough hay. After this the plants grew for some weeks in a sun-temperature often exceeding 100°, without injury. In the fens this species seems to be an inhabitant of shallow ditches, much overgrown with reeds and sedges. It is usually

lifted out of water by the stems of these plants as they advance in growth, and then presents the appearance of a climbing plant. In such situations it produces flowers, but I have never seen fruit produced, except in submerged plants.

When quite forsaken by the water *P. varians* produces a small rosette of leaves at each joint of its thread-like branching stem. Each of these tufts of leaves is capable of becoming a separate plant as the season advances. In this species and the *nitens*-form the bead-like tubers from the land-forms (as before mentioned) are most freely produced. Here perhaps we have the most real advance towards an amphibious *Potamogeton*, as not only is growth successfully accomplished in the open air, but an equally successful storing up of organisable matter to continue the life of the plant another season results from that growth. In this way it seems quite possible for *P. varians* and its allied forms to exist for season after season without being submerged at all; certainly some ditches in which it grows are dry for a great part of every summer. In one ditch I knew the land-form of one of these "species" year after year before I was able to obtain the water-form at all.

The land-form of *P. varians* has a short erect stem, the lower leaves are reduced to a midrib, but *shorter than the whole tuft* or plant, which is generally pressed to the ground and spread out in the form of a rosette. These linear leaves are succeeded by a pair of broader linear-lanceolate, or oblong, acutely pointed mucronate membranous translucent leaves, and to these succeed two or more coriaceous, ovate or elliptical, or spathulate leaves.

The nearest plant to these *varians-nitens* forms is a *Potamogeton* which I consider to be identical with the *P. coriaceus* of Nolte. The shallow-water form of this is well figured in Reichenbach, 'Icones,' v. 7, pl. 38, from a specimen supplied by Nolte himself. The land-form of our fenland plant, whatever it may be, has suborbicular coriaceous leaves, and the lower ones are reduced to "phyllodes," as in *P. natans* and *P. heterophyllus*.

P. Zizii Roth.—This species produces a well-marked land-form. The stolons from which it springs are often a foot or more deep in the mud; from these a stem springs up, with subterranean stipules at each joint, the lowest leaves are reduced to a midrib, these grow at the base of an *erect rarely branched stem;* upper coriaceous leaves with very short petioles, like those in Reichenbach's figure of *P. coriaceus;* these upper leaves show a curious tendency to vary away from typical *Zizii*-forms, and some become spathulate, like those of *P. varians*, others suborbicular, like those of *P. coriaceus*, but these latter "species" produce such leaves also in deep water.

In a very limited degree *P. Zizii* has the power of retaining vitality in the already produced subaqueous shoots, like *P. heterophyllus* and *P. varians*, but these shoots generally die down in ditches which have become perfectly dry, and then the plant grows by its true land-form only, like *P. natans* and *P. fluitans*.

In the deep-water stations of *P. Zizii* land-forms may be noticed by the sides of drains when the level of the water has become lowered; they also occur in *P. natans* growing in similar

situations, showing that these plants, even when growing habitually in deep water, retain the power of producing land-forms the moment the water leaves any of their outlying stolons uncovered.

The above is a fair description of our larger "typical" *Zizii*-forms, but we have a shallow-water form of this species growing in the Westmoor district, near Chatteris, which seems to possess a power of living out of water almost equal to that of *P. heterophyllus*, a power not shared by the ordinary shallow-water *Zizii*-forms of the fens.

P. lucens L.—This species does not produce coriaceous floating-leaves in the fens. I carefully sought for them, but even in the hottest weather no attempt was made to produce them, even when the plant grew in shallow water. As soon as the plants were left fully exposed to the air, they withered and died down in a few hours, just as *P. perfoliatus* and other deep-water forms did. As long as an inch or two of water remained this species made some attempt at growth and the production of new shoots, just as *P. prælongus* did in a similar case, and in both species subaërial shoots were produced on the muddy edges of the spots where they grew; but as soon as the water quite dried up the whole patch of *P. lucens* died away, and no traces of the incipient land-form could be found. Here, then, we have a remarkable physiological difference between *P. lucens* and *P. Zizii*, which can hardly be forms of one species, as many botanists suppose. In its whole manner of growth *P. Zizii* is much more nearly allied to *P. heterophyllus* than to *P. lucens*. All I have observed during the past summer induces me to believe that, at the present time, each form of the *lucens* group is so far constant that seed of each form produces its like. Their imitation of one another under variation, induced by abnormal circumstances, may betray a comparatively recent common origin, but at the present day our fenland pondweeds certainly seem to be "fixed quantities."

These crude notes, roughly made during the past season, are published more with the intention of drawing attention to a little-known subject, full of promise for field-botanists, than with the view of furnishing any exact or valuable information—years of observation will, perhaps, be required before *Land-forms* can be sufficiently well known to be made available for the discrimination of species in the genus *Potamogeton*.

REMARKS ON THE NOMENCLATURE OF THE EIGHTH EDITION OF THE 'LONDON CATALOGUE.'

By B. Daydon Jackson, Sec. L.S.

(Continued from p. 233.)

961. The simple-leaved variety of the ash, *Fraxinus excelsior* var. *diversifolia* Ait. Hort. Kew. iii. 445 (1789), has the later synonyms *S. simplicifolia* Willd. Berl. Baumg. 121 (1796), and *S. heterophylla* Vahl, Enum. i. 53 (1805).

982. There is a variety *subglaber* (sic) described by Mérat, Nouv. Fl. Env. Paris, 73 (1812), but it refers to the next species.

983. *Cynoglossum germanicum* Jacq. Obs. ii. 31 (1767). *C. montanum* Lam. Fl. Fr. ii. 277 (1778). *C. sylvaticum* Haenke in Jacq. Collect. ii. 77 (1788).

993. *Mertensia maritima* Gray, Nat. Arr. 354 (1821); Don, Gen. Syst. iv. 320 (1837).

995. *Myosotis palustris* Relh. Fl. Cant. 76 (1785); Roth, Tent. i. 87 (1788); With. Bot. Arr. ed. 3, ii. 225 (1796). Relhan is thus eleven years earlier than Withering. Var. *strigulosa* Mert. & Koch, Fl. Deutschl. ii. 42 (1826).

996. *M. repens* "G. Don MSS. ined." is the authority given in Hooker's 'Flora Scotica,' 67 (1821), for this Forget-me-not. Mr. Roper points out that Gray, Nat. Arr. ii. 348, for this name, cites "Don Cat." What this refers to I cannot at present say; could it have been a list of the plants George Don was prepared to supply? Hooker's preface is dated April, and Gray's frontispiece to vol. i. is dated November of the same year, 1821.

997. *M. alpestris* Schmidt, Fl. Boëm. 26 (1795), is clearly earlier than Willd. Enum. 175 (1809.

999. *M. arvensis* Willd. Prod. Fl. Berl. 77 (1787), is the earliest specific use of Linnæus's varietal name *arvensis* known to me, Roth (1788) and Hoffmann (1791) being later. Nyman refers our plant to *M. intermedia* Link, Enum. Hort. Berol. i. 164, as the restricted *M. arvensis* of Lehm. Asper. i. 92. I hope to give some remarks on this set of plants at a later date.

1016. Mr. Druce writes, "*Solanum nigrum* var. *luteo-virescens* (Gmel.) has a prior name = *S. humile* Bernh." [ex Willd. Enum. 236 (1809)].

1029. *Linaria Elatina* is Miller's spelling, and it was possibly intended by him as an emendation of the old pre-Linnean *Elatine*: the usual method seems to have first seen the light in Aiton, 'Hortus Kewensis,' ed. 2, iv. 11.

1039. Mr. Druce asks whether *Scrophularia umbrosa* Dum. Fl. Belg. 37 (1827), is not identical with *S. alata* Gilib. Fl. Lithuan. ii. 117 (1781), as Grenier considers, Fl. Jurass. 554.

1051. *Veronica persica* Poir. Encyc. viii. 642 (1808) = *V. Tournefortii* C. C. Gmel. Fl. Bad. i. 6 (1806), according to Boissier, Fl. Orient. iv. 466. Gmelin's species was founded on what appears to be a white-flowered form of the species; whilst Tenore took the ordinary striped form, figured on the same plate by Buxbaum, as his type. The earlier *V. Tournefortii* Villar seems to fall into *V. officinalis*, according to Verlot, Pl. Vasc. Dauph. 257.

1059. *V. saxatilis* Scop. Fl. Carn. ed. 2, i. 11 (1772) = *V. fruticans* Jacq. Enum. Vindob. 2, 200 (1762). Scopoli praises Jacquin's description as thoroughly defining the plant as distinct from Scopoli's *frutescens*.

1066. *V. Anagallis*.—This was the name used by Linnæus in his 'Pan Suecus,' Am. Acad. ii. 236 (1749), but in the first edition of the 'Species Plantarum' (1753), generally accepted as the foundation of the binomial nomenclature, it appears as *Veronica*

Anagallis ▽. It is singular that this sign, which is not of uncommon use in Linnæus's works, should have puzzled Hartmann in his 'Annotations of the Scandinavian Plants in the Linnean Herbarium.' "▽ : *tica* (quod signum, quid significet, cernere non potui)". Annot. p. 28. The last case clearly means *aquatica*, and was so understood by the writers who were contemporary with Linnæus; for instance, Leers, Fl. Herborn. 3; Huds. Fl. Angl. ed. 2, 296; Reich. Fl. Moeno-Franc. 4. *Anagallis aquatica* was the old name used by Lonicerus, Lobel, and others, and was therefore well known to those who studied Botany before the second half of the eighteenth century. Linnæus used the sign inverted to denote wind in his manuscript diary. *Sisymbrium Nasturtium-aquaticum* is another instance of the sign under discussion. *V. Anagallis* in its present and shortened form was first used by Jacquin, Enum. Vindob. 3 (1762).

1068. *Euphrasia officinalis* var. *gracilis* (Br.). — "Might we not as well use the name of var. *nemorosa* Pers. [Syn. ii. 149] (1807)? This is certainly on record for more than three counties." — *Mr. Druce.*

1069. *Bartsia Odontites* Huds. — "I fail to follow the names of the varieties. Is *serotina* not of Berl. 1819 rather than Reichb., who described it, I believe, as *Odontites serotina?* Is *verna* (which Reichenbach called *Odontites*) only on record for three counties? What is *divergens* Balb.? Hooker and Nyman give *Odontites divergens* Jord.? The *Euphrasia rotundata* Ball, I suppose, is discarded."—*Mr. Druce.*

Melampyrum should follow *Rhinanthus.*

1078. *Rhinanthus Crista-galli* Linn.— Mr. Druce writes, "The Linnean *Crista-galli* was made up of *minor* Ehrh. and *major* Ehrh. Pollich's *Crista-galli* was the *minor* of Ehrh." But many Linnean specific names are now used in a restricted sense; Dr. Mueller, of Aargau incurred reproach when applying the rule here advocated, to the full conclusions, in the *Euphorbiaceæ* of DeCandolle's 'Prodromus.'

1081. *Orobanche cærulea* Vill. Fl. Dauph. ii. 406 (1787), is preceded by *O. purpurea* Jacq. Enum. Vindob. 252 (1762).

1084. *O. rubra* Sm. in Engl. Bot. t. 1786 (1807). — "Almost certainly *O. Epithymum* DC." Fl. Fr. iii. 490 (1805).—*Mr. Druce.*

1102. *Mentha rotundifolia* Huds. Fl. Angl. ed. 1, 221 (1762). —This name was adopted by Linnæus in Sp. Pl. ed. 2, 805, where Hudson is cited.

1104. *M. sylvestris* Linn. Sp. Pl. ed. 2, 804, must give way to *M. longifolia* Huds. Fl. Angl. ed. 1, 221 (1762). *M. candicans* Mill. Gard. Dict. ed. 8 (1768).

1106. *M. piperita.* — Mr. Druce points out that the authority is not Hudson, but Linn. Sp. Pl. ed. 1, 576.

1108. *M. hirsuta* Huds. Fl. Angl. ed. 1, 223 (1762), is earlier than Linn. Mant. 81 (1767).

1122. *Calamintha Nepeta* Clairv.—"(1811) also of Link (1809), and Savi, Fl. Pis. [ii. 63] (1798), but the name to be adopted is *C. parviflora* Lam." Fl. Fr. ii. 396 (1778).—*Mr. Druce.*

1131. *Scutellaria minor* is of Hudson, Fl. Angl. ed. 1, 232.

1142 and 1143. Concerning these, Mr. Druce writes:—"The Linnean herbarium plant is the *intermedia* Vill. on record, according to the 'Student's Flora,' from Denbigh and Moray. In the Lond. Cat. the census number is given as 79. Does this census number refer to *Ladanum* hb. Linn. or to *angustifolia* Ehrh.? The latter is considered in the 'Student's Flora' to be identical with *G. canescens* Schultz. This Koch keeps separate. It has 'caulis superne et calyces pilis brevibus patentibus dense tecti.' In *angustifolia* 'pili omnes adpressi.' The *Galeopsis* of our Oxford and Berks chalky corn-fields is certainly not like continental *angustifolia*. It should, I suspect, be referred to Reichenbach's *G. Ladanum* Fl. Exc. 322, the *latifolia* of Wimm. et Grab. Fl. Silic. ii. 190."

1150. *Lamium hybridum* Vill. Fl. Dauph. i. 250 (1786); in vol. ii. 385 (1787), reduced as a variety of *L. purpureum*. Later names are *L. dissectum* With. Bot. Arr. ed. 3, 527 (1796), and *L. incisum* Willd. Sp. Pl. iii. 89 (1800).

1155. *Ballota nigra* L.—"If *alba* be worth retaining as a variety, the arrangement would, I think, be better thus:—a. *fœtida* (Lam.); b. *alba* (L.); c. *ruderalis* Sw. Nyman considers the Linnean *nigra* to be identical with the latter variety. In Spec. Plant. it is described as having 'calycibus acuminatis,' *alba* having 'calycibus subtruncatis.'"—*Mr. Druce.*

1165. *Plantago argentea* Chaix in Vill. Fl. Dauph. i. 376 (1786); ii. 302.

1166. *P. lanceolata* var. *Timbali* Reichb. f.

1169. *P. arenaria* Waldst. et Kit. Pl. Rar. Hung. i. 51, as pointed out by Mr. Druce.

1170. *Littorella* was founded by Bergius in the Stockholm 'Handlingar' for 1768, p. 341; when Linnæus adopted the genus in his 'Mantissa' (1771), 160, he altered the specific name *juncea* to *lacustris*. If priority of names be regarded, the plant should be termed *L. juncea* Berg.

Mr. Roper asks what becomes of *Amaranthus Blitum* L.?

1179. *Chenopodium polyspermum* L.—The varieties *spicatum* and *cymosum* of Moquin-Tandon, Mon. 22 (1840), seem to have been previously characterised by Koch in the first edition of his 'Synopsis,' 607 (1838), as *cymoso-racemosum* and *spicato-racemosum*. Moquin-Tandon's revision of the order in DC. Prod. was published in 1848, not 1826, as a correspondent states.

1181. *C. album* var. *caulicans* Syme (1867) has an earlier varietal name, *incanum* Moq. Monog. 29 (1840). The variety *poganum* Syme (1867) is also antedated by *viridescens* St. Amans, Fl. Agen. 105 (1821).

1186. *C. urbicum* var. *intermedium* Moq. — "Here the name *rhombifolium* Muehl. *ap.* Willd. appears to have priority."—*Mr. Druce.*

1192. *Atriplex littoralis* var. *marina* (Linn.) Mant. (1768).—Hudson's *serrata* was described as a species in Fl. Angl. ed. 1, 377 (1762). The variety *A. littoralis* var. *serrata* Moq. in DC. Prod. xiii. pt. 24, p. 97 (1849). Syn. *A. littoralis* var. *marina* Syme.

1193. "*A. patula* proper equals *erecta* Huds."—*Mr. Roper.*

1194. *A. hastata* Huds. Fl. Angl. ed. 1, 377.— "Syme says the plant of the Linnean herbarium is *A. calotheca* Fries."—*Mr. Druce.* See Hartman, Adnot. 191.

1197. *A. laciniata* L.—"Syme says, 'Linn. hb., not of Sp. Pl.'" —*Mr. Druce.*

1200. *Salicornia herbacea* L. — "If the varieties are worth including, why not put var. a. *acetaria* Moq.?"—*Mr. Druce.*

The variety b. *prostrata* is of Moq. Monog. 115.

1202. "*Polygonum mite* Schrank. Fl. Bay. [i. 668] (1789).—This is doubtless right, since *P. strictum* Allioni, Fl. Ped. [ii. 207 (1785)] included *P. minus;* Meissner, however, appears to consider them identical. Persoon's *mite* is not European."—*Mr. Druce.*

1224. *Rumex limosus* Thuill. Fl. Par. ed. 2, 182 (1799), is earlier than *R. palustris* Sm. Fl. Brit. i. 394 (1800).

(To be continued.)

SHORT NOTES.

Rubus Leesii in Scotland. — During a recent visit to Moffat I had the good fortune to pick up *Rubus Leesii* Bab. The plant was in quantity, in fine flower, and presents a most distinct appearance. If I mistake not, this is the first Scotch locality for it.—A. Craig Christie.

Grimmia commutata Hübn. in Essex. — A moss which I have observed for several years on an old tiled roof at Wickham Bishops, Essex, has been determined by Mr. Mitten to be *Grimmia commutata* Hübn. In view of the small number of Scotch localities, and the single locality, so far as I am aware, of Rydal Water, south of the border, one is tempted to derive the occurrence of this plant in the eastern counties from the transportation of the spores by wind from Scandinavia, where it is common; and this especially in consideration of the general absence of fruit in these islands. This would be borne out by the presence of some other isolated Scandinavian species of plants in the eastern counties, whose presence has been accounted for in the same way. I have observed the moss for two or three years without finding any trace of fruit.—H. N. Dixon.

Catharinea Dixoni (Journ. Bot. 1885, p. 169).—I regret to find that this description must be cancelled, the plant in question having recently been determined by Lindberg to be only a form of *Polytrichum gracile* with the lamellæ of the leaves in abnormally small numbers; *vide* Braithwaite, Brit. Moss Flora, Suppl. to vol. i. p. 295.—H. N. Dixon.

Polypodium Dryopteris Linn. in Oxon. — In Journ. Bot. 1883 (p. 279) I recorded the discovery of this fern in a Buckinghamshire wood by the Rev. A. Robertson and Mr. E. Armstrong. This year I heard it was known to grow in a neighbouring wood in Oxfordshire. Last month, on a special excursion of the Chiltern Natural History Society, the President, Mrs. Coker Beck, was fortunate

enough to meet with it, the Secretary, Miss Beatrice Taylor, and myself being present close to the spot at the time. It was originally discovered in the wood, we were told, by a butler of Lady Macclesfield's. I refrain from giving the precise locality.—G. C. Druce.

Note on a Potamogeton. — Last August, when collecting specimens with Mr. A. Fryer, of Chatteris, we came upon a curious result of the unusually dry season by finding specimens of a *Potamogeton* (referred by the Rev. T. Morong to his *P. varians*) in a perfectly dry ditch where coarse hay was being made, and whence I gathered examples *from under the hay*. I am well aware that generally some specimens of many species may be found on the margins of drying-up ponds, &c., in summer; but in the instance above mentioned it is certain that the ditch had never been known to be dry before for at least thirty years. The various forms assumed by *P. Zizii* were very interesting, especially in the profuse production of floating leaves.—Arthur Bennett.

New Surrey Plants. — Mr. James Epps, jun., sends me *Euphorbia Esula* L., var. *pseudo-cyparissias* (as *E. Cyparissias*), from an old chalk road near Martin Park, but only a single plant was seen. I have found *Potamogeton prælongus* Wulf. and *Chara contraria* Kütz. (confirmed by Messrs. Groves) in pools by Walton Bridge. I have always thought that the pondweed would be found somewhere by the Thames in Surrey, but I have only seen it in the above locality, although I have now investigated the whole length of the River Thames within the county limits.—W. H. Beeby.

The Sussex Pyrola media. — The record of this plant in Top. Bot. (ed. 1 and 2) stands thus:—"13. Sussex . . . ? Borrer ms." Mr. Hemsley includes it without query in his 'Outline of the Flora of Sussex' (Journ. Bot. 1879, App.), and there are specimens in Borrer's herbarium. I have myself seen the plant this year in Borrer's station, St. Leonard's Forest, West Sussex, where it grows sparingly over a wide tract of country. The occurrence of the plant in this isolated station is so remarkable that it seems worth while to draw attention to the fact that it is really a native of West Sussex. The nearest counties for which it is recorded are Worcester, Warwick, and Stafford; and even they are southern outliers from the general distribution of the species in Britain.—W. H. Beeby.

Limnanthemum peltatum Gmel. in Northants.—In Mr. Druce's notes on the Flora of Northamptonshire (Journ. Bot. 1886, p. 373), the above-named plant is included in a list of probable extinctions, about which recent verification is desirable. In August last, while fishing in the Middlemoor Reservoir, near Daventry, I saw the plant in bloom on that water in such abundance as to remove all fear of its extermination. The locality is just within the Nene basin, and seems to be well to the north of the area marked out for the distribution of *Limnanthemum* in the 'Student's Flora,' 3rd ed. —J. T. Powell.

NOTICES OF BOOKS.

Annals of Botany. Edited by Isaac Bayley Balfour, M.A., Sydney Howard Vines, M.A., and William Gilson Farlow, M.D., assisted by other botanists. Oxford: at the Clarendon Press. Vol. i., No. 1. August, 1887. Price 8*s*. 6*d*. 8vo, pp. 88, xli. 6 plates.

We have received the first number of this new work, which is to be issued at uncertain and irregular intervals "for the publication of original papers, adequately illustrated, on subjects pertaining to all branches of botanical science." The new journal was practically determined upon at a "preliminary meeting of botanists" held in London about a year ago, the attendance at which was, we believe, confined to representatives of the more recent school of botanical research. The project, however, had been mooted some time previously, it having been felt in some quarters that the exclusion of botanical papers from the 'Quarterly Journal of Microscopical Science' rendered it desirable to find some other medium of publication, in which the papers could be fully illustrated.

Although we were not consulted on this subject, or even made aware of the proposed undertaking, we felt it our duty to confer with the promoters of the new enterprise to ascertain whether some arrangement could not be made whereby the existing 'Journal of Botany' might be extended so as to meet their views. In our volume for 1882 (p. 385) we clearly indicated our consciousness of the shortcomings of the Journal, drawing especial attention to the fact that "straitened resources have prevented the possibility of furnishing the extensive series of illustrations necessary to the satisfactory presentment of papers upon minute structure"; and Dr. Trimen on the same occasion remarked, "it is no secret that the Journal has never been a success financially." This, unfortunately, is still true: it pays its way, and that is all. Its position would of course have been better had those who are associated with the new venture devoted their energies towards improving the old; and an increase in the list of subscribers would have enabled their contributions to be properly illustrated. That they thought it more desirable to establish a new medium of publication in no way calls for adverse criticism; although we may express a hope that neither the publications of the Linnean Society nor our pages may suffer by its establishment.

We regret, however, that the programme of the 'Annals' should include work which it seems to us is already adequately provided for by the Linnean Society and by this Journal—such as systematic botany, geographical distribution, and the like. Had these been less prominently put forward, the Editors of the 'Annals' could have incurred no suggestion of a desire on their part to conflict with existing interests; and we think they will do wisely to restrict themselves to ground which is comparatively unoccupied. The present number, indeed, suggests that such will be the case. It contains four papers: one by Messrs. W. Marshall Ward and John Dunlop, 'On some points in the Histology and Physiology of the

Fruits and Seeds of *Rhamnus*' (with two plates); one by Messrs. W. Gardiner and T. Ito, 'On the structure of the mucilage-secreting cells of *Blechnum occidentale* and *Osmunda regalis*' (with two plates); one by Miss Agnes Calvert and Mr. L. A. Boodle, 'On laticiferous tissue in the pith of *Manihot Glaziovii*, and on the presence of Nuclei in this Tissue' (with one plate); and one by Mr. W. H. Gregg, 'On anomalous thickening in the roots of *Cycas Seemanni*' (with one plate). There are also notes by Messrs. F. W. Oliver, J. R. Vaizey, J. H. Blake, I. B. Balfour, and Miss Agnes Calvert, and a review of Mr. Ward's translation of Sachs' Physiology. A criticism of these papers would involve a detailed knowledge of the subjects dealt with, which the present writer cannot claim; the names of the authors, however, is a guarantee of their value: the plates are good, though not remarkably so: and the printing, like all that comes from the Clarendon Press, is excellent. We take exception to Mr. Gardiner's statement that "in the case of composite papers it is not uncommon to attach all the credit to the person whose name appears first on the title-page"—a statement which we believe to be unfounded in fact. Who would dream of attaching "all the credit" of the 'Enumeration of Chinese Plants' now appearing in the Linnean Society's Journal to Mr. Forbes, because his name appears before that of Mr. Hemsley? Did anyone ever overlook Mr. Daniel Hanbury's share in 'Pharmacographia' because Flückiger's name preceded his on the title-page of that work?

The most disappointing part of the number is that which should be the most generally useful—we refer to the 'Record of Current Literature,' which is to be "a special feature" of the undertaking. Both in plan and execution it contrasts very unfavourably with the similar work done in the 'Monthly Microscopical Journal.' The first part is devoted to "books and pamphlets"; although the first entry appears from its title—"Herbier des Muscinées de Belgique. Cent. i."—to be a collection of specimens, and other exsiccati are included. We note that the surname only of each author is indicated: there is no indication of the size or extent of the works cited, the information as to publisher and place of publication is meagre, and no price is given. The works are catalogued alphabetically under the names of the writers; and there is no attempt at classification. In the second part, "Periodical Literature," these shortcomings are more conspicuous. It is surely unreasonable to employ such names as Smith, Clarke, White, Gray, Oliver, and Bennett, without any indication as to which of the botanists sharing this patronymic is intended. Occasionally, indeed, initials are given, as in p. xxxiii., where "A. W. Bennett" is thus distinguished; but the same writer appears as "Bennett" on the following page; in other places our friend Mr. Arthur Bennett is intended by the name, although on p. xxxviii. he is styled "A. Bennett." Nor is the compiler consistent; for Mr. Dyer is always referred to as "Thiselton Dyer." The disposition of type might be much improved; while the want of classification of any kind very greatly diminishes the usefulness of the list. It seems strange that no attempt should be made to supply information additional to that given in the title of the paper, which often amounts to none at all: no one will be the wiser for

knowing that Mr. Dyer wrote about "A Plant which destroys the Taste of Sweetness," although, if the name of the plant were added, some information would be conveyed. We are well aware of the brittleness of our own windows, so our reference to the somewhat frequent typographical errors must be a passing one: but it might fairly be expected, from the position and ability of the Editors, that more care would have been taken in this particular. We are credited with having published "*Egisteum litorale* as a British plant"; while the heading (p. xxxv.) "*Herechys sanguinea*; does it vesicate?" made us so conscious of our ignorance that we at once referred to the 'Pharmaceutical Journal' to find out the plant in question: we found to our relief that *Huechys*, a coleopterous iusect, was intended, but this seems somewhat out of place among botanical literature. A record of botanical works would, as the Editors say, be "especially desirable," if undertaken on useful lines; but if the present instalment is to be taken as a specimen, we do not see that much advantage will accrue from their mode of carrying out the scheme. J. B.

Dr. Braithwaite has issued a handy 'Check-list of British Mosses' for vol. i. of his Moss-flora, well printed on one side of the paper, which may be obtained from the author, 303, Clapham Road, S.W., for 3*d*. post-free.

The 'Wesley Naturalist' (which has now reached its sixth number) is the Monthly Journal of the Wesley Scientific Society, which has been instituted with a view "to afford to men of scientific tastes and attainments an opportunity of using their talents and knowledge in distinct alliance with the Christian religion." It contains a large number of short papers upon different branches of science. We must demur to the attempt of the botanical editor to change the popular names of two of the Cranes-bills; and we do not wonder that his correspondent was puzzled when told that *G. columbinum* was the Dovesfoot. It is also regrettable that Mr. H. P. Fitzgerald's 'Dictionary of the Names of British Plants' should be styled "a useful little work."

New Books.—L. Simonkai, 'Enumeratio Floræ Transsilvanicæ vesculosæ critica' (Budapest: 8vo, pp. xlix. 678: 1886). — F. Wolle, 'Fresh-water Algæ of the United States' (Bethlehem: 8vo: vol. i. (text), pp. xi. 364; vol. ii. (plates), tt. 157.—R. Sulzberger, 'Les Orchidées' (Bruxelles, Manceaux: 8vo, pp. 23.—W. Lahm, 'Flora der Umgeburg von Laulach (Oberhessen)' (Giessen, Ricker: 8vo, pp. xxxii. 106: map), — E. Empeyta, 'Catalogue descriptif des Arbres, arbustes, arbrisseaux, et sous-arbrisseaux indigènes ou naturalisés en Suisse, suivi d'un Dictionnaire des principaux noms vulgaires' (Genève, Carey: 8vo, pp. 211).

Articles in Journals.

American Naturalist (Aug.). — E. L. Sturtevant, 'History of Garden Vegetables.' — H. C. Abbott, 'Comparative Chemistry of Higher and Lower Plants.'

Botanical Gazette (Aug.).—W. G. Farlow, 'Vegetable parasites and evolution.' — M. Mervy, 'Identity of *Podosphæra minor* Howe and *Microsphæra fulvofulcra* Cooke' (1 plate). — W. G. Farlow, Obituary of H. W. Ravenel (May 19, 1814—July 17, 1887).

Bot. Centralblatt. (No. 36). — R. v. Wettstein, 'Ueber *Helotium Willkommii* und einige ihm nahe stebende *Helotium*-Arten.' — (No. 37). M. Kronfeld, 'Uber die augebliche Symbiose zwischen *Bacillus* und *Gloeocapsa*.'—(No. 38). H. Schulze, 'Ein Beitrag zur Kenntniss der vegetativen Verhmehrung der Laubmoose.'

Botaniska Notiser (häft. 4). — O. Nordstedt, 'Algologiska småsaker.' — P. W. Strandmark, 'Forgremingen och bladställningen hos *Montia* sens kildtmed afseende på frågan om blommans orientering' (1 plate). — C. Melander, '*Utricularia litoralis* (*ochroleuca* × *intermedia*).' — F. Behm, 'Fråu botaniska excursioner i Jemtland och Herjedalen' (*Salix Ahlberghi*, sp. n.; *S. glaucella* Bohm.; *Cicuta pumila*, sp. n.; *Stellaria laxa*, sp. n.).

Botanische Zeitung (Sept. 2, 9, 16). — S. Winogradsky, 'Ueber Schwefelbacterian.'—(Sept. 16, 23). L. Jost, 'Zur Kenntniss der Athmungsorgane der Pflanzen' (1 plate).

Bull. Bot. Soc. France (xxxiv. Comptes Rendus 4). — P. Duchartre, 'Sur un Begonia phyllomane.' — A. Leblois, 'Production de thylles a l'intérieur des canaux sécréteurs.'—G. Camus, 'Note sur l'*Orchis alatoides* Gadec.'—M. Battandier, 'Sur les causes de la localisation des espèces d'une région.' — D. Clos, 'Une mot sur trois plantes—*Allium vineale*, *Androsace Chamæjasme*, *Daphne Philippi*.'—P. Duchartre, 'Observations sur le *Pinguicula caudata*.' — L. du Sablon, 'Sur le développement des suçoirs du *Thesium humifusum*.' — P. Van Tieghem, 'Sur le réseau sus-endodermique de la racine des Rosacées.'—M. Gandoger, 'Plantes de Gibraltar.'—. Boulay, 'Sur la flore tertiaire des environs de Privas (Ardéche).'

Flora (Aug. 11, 21).—E. Lietzmann, 'Ueber die Permeabilität vegetabilische Zellmembranen in Bezug auf atmosphärische Luft.' —(Sept. 1). J. A. Knapp, Obituary of H. Wawra (Feb. 2, 1831—May 24, 1887). — J. Müller, 'Lichenologische Beiträge.' — (Sept. 11, 21). C. Müller, 'Sphagnorum novorum descriptio' (30 new species).

Gardeners' Chronicle (Sept. 3). — *Peristeria selligera* Rchb. f., sp. n.—C. T. Druery, 'Our Native Ferns.' — (Sept. 24). *Odontoglossum Schræderianam* Rchb. f., *Huernia aspera* N. E. Br., spp. nn. —W. B. Hemsley, 'The Botanical Magazine' (contd.).

Journal de Botanique (Sept. 1).—C. Flahault, 'Les Herborisations aux environs de Montpellier.' — E. Bondier, *Helvella pithyophylla*, sp. n. (1 plate). — E. Bonnet, 'Florule des îles Saint-Pierre et Miquelon' (contd.). — (Sept. 15). N. Patouillard, 'Étude sur le genre *Laschia*' (*L. celebensis*, *L. Gaillardi*, *L. clypeata*, spp. nn.: 1 plate).—P. Hariot, 'Note sur le genre *Mastodia*.'

Œsterr. Bot. Zeitschrift (Sept.). — L. v. Vukotinovic, 'Zur Rosenflora von Agram.'—B. Blocki, '*Hieracium polonicum*, sp. n.'— E. Formánek, 'Flora von Nord-Mähren.'—G. Schneider, 'Über die Hieracien des Riesengebirges.'—J. Freyn, 'Meine dritte Tirol-Fahrt.'

William Ferguson, F.L.S., died at Colombo, Ceylon, on the 31st of July last, a few days after the sixty-seventh anniversary of his birth. From the time of his arrival in the Colony in 1839, at the age of nineteen, he had been an enthusiastic collector, and a close observer of Nature. His work as a surveyor early took him into the forests of unexplored districts, and he acquired a familiar knowledge of the plants of the island long before he possessed any means of ascertaining their names or relationships. His friendship and correspondence with the late Dr. Thwaites, which commenced about 1853, was mutually beneficial; for many years Ferguson continued to add numerous species to the Ceylon flora, which Thwaites duly incorporated in the successive parts of his 'Enumeratio.' A short visit to London in 1857 was almost wholly spent at the British Museum, where, with the assistance of Brown and Bennett, he carefully examined Hermann's Ceylon herbarium; to this time he ever after looked back with peculiar pleasure. For the last twenty-five years he lived almost continuously in Colombo, and became very well known and appreciated for his genial, courteous and pleasant manner, and his kindly and unselfish readiness in assisting all naturalists with his wide and varied information. He was indeed a good example of the old school of naturalists, and, though Botany was his chief and favourite pursuit, he had a good knowledge of Zoology generally, and a minute acquaintance with the Reptile Fauna of Ceylon. As a botanist, Ferguson was a keen and enthusiastic observer in the field, with a first-rate eye for differences, and a very retentive memory; but he never paid much attention to the minuter characters of plants. He was specially interested in the history of species and possessed a very good knowledge of the bibliography of the Botany of the East, and a determination always to get at original sources of information. His writings were largely of an ephemeral nature in the local periodicals and newspapers, but as early as 1850 he published at Colombo a remarkable and unique little book on the Palmyra Palm, now become very scarce. His other botanical papers were an account of the Timber Trees of Ceylon (1863), Notes on Ceylon Ferns (1880), and a list with Notes of Ceylon Grasses in the Journal of the local R. Asiatic Soc. for 1880–81. He had made a special study of the Algæ of the island; his proposed joint paper on them with Prof. Dickie was never printed, but they are included in the enumeration of Ceylon Algæ published by Mr. Murray in the 'Annals and Magazine of Natural History' for July last. He largely helped Sir E. Tennent in the preparation of his well-known work on 'Ceylon'; and published several papers on Ceylon Reptiles and other subjects, and always kept up a large correspondence with naturalists. But the special part he played was that of a collector of materials for the use of others, and his generosity and constant endeavour to be of use in this way, at whatever personal trouble, will always be gratefully remembered by all who had the pleasure and advantage of knowing him. Dr. (now Sir Joseph) Hooker dedicated to him a curious herbaceous Ceylon Rubiacea, *Fergusonia*, in 1873 (Gen. Plant. ii. p. 133). It was afterwards figured in Ic. Plant. t. 1124.

Henry Trimen.

FERNS COLLECTED IN PERAK BY FATHER SCORTECHINI.

By Col. R. H. Beddome, F.L.S.

(Plate 278).

[Some two years before his lamented death, Father Scortechini forwarded me two papers on the Ferns of Perak, with a request that they might be submitted for criticism to those who had opportunities of consulting the Herbaria of the British Museum and Kew. Subsequently F. Scortechini sent over his collection to the Colonial Exhibition of 1886, and this afforded an opportunity for comparison of the actual specimens of the species described with the plants in the two Herbaria. Mr. Baker and Colonel Beddome were good enough to undertake this; and found, as F. Scortechini had expected, that several of the supposed new species were identical with types already described. The necessary corrections were made, and the MSS. were returned at his request to F. Scortechini; but his illness and death prevented his doing anything with them, if, indeed, he even saw them. They were then returned to me; and Col. Beddome has now carefully gone through them, and prepared the following list. The specimens referred to are nearly all in the British Museum Herbarium. The species marked * have not been previously recorded from the Malay Peninsula.—Ed. Journ. Bot.]

Gleichenia dicarpa Br. var. β. *vulcanica* Bl.
G. Norrisii Mett.
**G. flagellaris* Spr.
G. dichotoma Willd.
Cyathea Brunonis Wall.

***Alsophila obscura** (Scort.).—"Caudex 6–7 ft. high; stipes 1–2 ft. high, densely clothed downwards with long lanceolate sharply serrated scales; fronds 4–5 ft. long, 2 ft. broad, bipinnate; rachis scaly above, naked beneath; pinnæ, the middle ones about 1–1½ ft. by 3–6 in., diminishing in size towards both ends; rachis hairy above, naked beneath; pinnules all free, lanceolate-oblong, base parallel with the rachis, apex obtuse, 1½–3 in. by ½ in.; subcoriaceous, glabrous on both sides, except on the hairy costa and scaly bullate costules beneath, cut half-way down to the rachis into broad obtuse segments; veins 4–5 on each segment, simple or more commonly forked; sori medial on the lower veinlets occupying the undivided portion of the pinnules mixed with transparent moniliform hairs." (Plate 278, fig. 2).

A. glabra Hook.
A. latebrosa Hook.
A. latebrosa Hook. var. with very broad segments. This is closely allied to *A. sikkimensis* Clarke.
A. glauca J. Sm.
A. Kingi Clarke (= *Bakeri* Zeiller).
A. commutata Mett.

***Alsophila trichodesma** (Scort.). — "Trunk middle size, slender; stipes scaly at the base; fronds 4–6 ft. long, bipinnate; rachis scabrid above, clothed with adpressed spreading semi-viscous

copious jointed hairs; pinnæ shortly petiolated, narrow, lanceolate, 24–30 in. by 6–8 in.; rachis clothed with the same hairs as the main rachis, stramineous; pinnules linear-lanceolate, 3–4 in. by ¾ in., thinly herbaceous, clothed with the same hairs as the rachis on both sides and on the costules and veinlets, cut down nearly to the rachis into linear, obtuse, crenulate, rather distant segments; veinlets 7–8 on each side forked; sori medial 5–6 on each side of the costule." Its nearest ally is the Sikkim *Alsophila Andersoni* (J. Scott). (Plate 278, fig. 2).

Matonia pectinata.
**Dicksonia* (*Cibotium*) *Barometz* Link.
D. (*Dennstædtia*) *ampla* Baker.
Lecanopteris carnosa Bl.
Hymenophyllum polyanthos Sw. var. *Blumeanum* Spr.
H. javanicum Spr. var. *badium* Hook. & Grev.
H. javanicum Spr.
H. Smithii Hook.
H. Neesii Hook.
**H. aculeatum* V. den B. (=*sabinæfolium* Baker.
**Trichomanes neilgheriense* Bedd.
T. parvulum Poir.
T. digitatum Sw.
T. pallidum Bl.
T. bipunctatum Poir.
T. pyxidiferum L.
T. auriculatum Bl.
T. javanicum Bl.
T. rigidum Sw.
T. maximum Bl.
T. pluma Hk.
Davallia (*Humata*) *heterophylla* Sm.
D. (*Humata*) *angustata* Wall.
D. ,, *pedata* Wall.
D. (*Prosaptia*) *Emersoni* Pres.
D. ,, *contigua* Sw.
D. (*Leucostegia*) *pulchra* Dru.
D. (*Leucostegia*) *hymenophylloides* Bl.
D. (*Leucostegia*) *nodosa* Presl.
D. solida Sw.
D. elegans Sw.
D. epiphylla Bl.
D. divaricata Bl.
D. Griffithiana Hk.
D. bullata Wall.
D. (*Microlepia*) *pinnata* Cav.
**D.* ,, *moluccana* Bl.
D. ,, *Speluncæ* Baker.
D. (*Stenoloma*) *tenuifolia* Sw.
Lindsaya cultrata Sw.
L. repens Thw.
L. scandens Hk.
L. orbiculata Lam.
**L. borneensis* Hk. (perhaps a form of *scandens*).
L. Lancea L.
L. rigida J. Sm.
L. divergens Wall.
L. lanuginosa Wall.
L. lobata Poir.
Pteris longifolia L.
P. cretica L.
P. semipinnata L.
P. patens Hook.
P. quadriaurita Wall.
P. aquilina L.
P. aquilina var. *esculenta* Forst.
P. (*Doryopteris*) *ludens* Wall.
P. (*Litobrochia*) *incisa* Thunb.
P. ,, *marginata* Bory.
Ceratopteris thalictroides Brong.
Lomaria (*Plagiogyria*) *pycnophylla* Kze.
Blechnum orientale L.
B. Findlaysonianum Wall.
Asplenium (*Thamnopteris*) *Nidus* L.

***Asplenium Scortechinii** Bedd. Stipes tufted, short, erect; fronds linear-lanceolate, 2–2½ ft. long by about 1 in. broad, gradually attenuated below into the stipe and at the apex into a long fine point, the margin entire or subentire, texture coriaceous, glabrous, or with a few scales on the lower surface; sori exactly

at right angles to the midrib, reaching two-thirds of the way to the edge. The affinity is with *Griffithianum*, but the fronds are much longer, with a much finer point, and the indusium is quite square to the rachis. Collected also by Mr. J. Day on Caulfield's Hill in Perak.

A. amboinense Willd. (=*A. fejeense* Brack.).
**A. squamulatum* Bl.
A. normale Don.
A. subavenium Hk.
A. longissimum Bl.
A. tenerum Forst.
**A. borneense* Hook.
A. hirtum Kaulf.
A. falcatum Lam.
A. macrophyllum Sw.
A. caudatum Forst.
A. cuneatum Lam.
A. nitidum Sw.
A. Belangeri Kze.
A. (*Diplazium*) ***subserratum*** Bl.
A. ,, *porrectum* Wall.
A. ,, ***pallidum*** Bl.
A. ,, *bantamense* Bl.
A. ,, *sylvaticum* Presl.
A. ,, *tomentosum* Hk.
A. ,, ***speciosum*** Mett.
A. ,, *sorzogonense* Presl.
A. ,, ***asperum*** Bl.
A. ,, *polypodiodes* Mett.
A. (*Anisogonium*) *cordifolium* Mett.
A. ,, *lineolatum* Mett.
A. ,, *esculentum* Presl.
Didymochlæna lunulata Desv.
D. polycarpa Baker.

Aspidium (*Polystichum*) *auriculatum* L. **var.** *marginatum* Wall.
A. (*Polystichum*) *auriculatum* L. **var.** *cæspitosum* Wall.
A. (*Polystichum*) *aculeatum* Sw. **var.** *biaristatum* Bl.
A. (*Pleocnemia*) *Leuzeanum* Hook.
A. (*Pleocnemia*) *membranaceum*, Hook.
A. (*Euaspidium*) *singaporianum* Wall.
A. (*Euaspidium*) *melanocaulon* Bl. **? fragment only.**
A. (*Euaspidium*) *vastum* Bl.
A. (*Euaspidium*) *subtriphyllum* Wall.
**A.* (*Euaspidium*) *pachyphyllum* Kze.
A. (*Euaspidium*) *variolosum* Wall.
A. (*Euaspidium*) *cicutarium* Sw. ?
Nephrodium (*Lastrea*) *gracilescens* Bl.
N.* (*Lastrea*) *gracilescens* Bl. **var. *glanduligera* Kze.
N. (*Lastrea*) *calcaratum* Bl. **var.** *β. sericea* J. Sm.
N. (*Lastrea*) *crassifolium* Bl.
N. (*Lastrea*) *crassifolium* Bl. **var.** *Mottleyanum* Hk.
N. (*Lastrea*) *syrmaticum* Hk.

*Nephrodium (Lastrea) Dayi Bedd. Stipes 1–2 ft. long, stramineous, glabrous or with a few hair-like scales towards the base; fronds 1½–2 ft. long; pinnæ 5–6 in. long, ¾–1 in. broad, lower ones scarcely at all reduced, cut down nearly to the rachis into linear oblong lobes 1½ lines broad, texture papyraceo-herbaceous, glabrous on both sides except the rachis above, which is finely puberulous; veins 6–8 on each side, simple, not reaching the margin; sori at the apex of the veins not immersed; involucre reniform, persistent. Resembles some forms of *Phegopteris distans*, collected also by Mr. Day.

N. (*Lastrea*) *Filix-mas* Rich. **var.** *elongata* Hook.
N. (*Lastrea*) *sparsa* Don.
N. ,, *Blumei* Hook.
N. ,, *Boryanum* Baker.
N. (*Eunephrodium*) *unitum* L.
**N.* (*Eunephrodium*) *eminens* Baker, Journ. Bot. 1880, p. 213.
N. (*Eunephrodium*) *pennigerum* Bl., **var.**
N. (*Eunephrodium*) *molle* Desv.
N. (*Eunephrodium*) *crinipes* Hk.

**Nephrolepis exaltata* L. (with red pubescence).
N. volubilis J. Sm.
N. biserrata Schott.
**N. acuminata* Hout.
Oleandra neriiformis Cav.
O. musæfolia Kze.
Polypodium (*Phegopteris*) *punctatum* Thunb.

***Polypodium** (PHEGOPTERIS) **laserpitiifolium** (Scort.). "Stipes tufted, fine, stramineous, 12–16 in. long, scaly downwards, naked above; fronds as long, deltoid-ovate, tripinnate; rachis glabrous; pinnæ numerous, lowest 4–6 in. by 2–3 in. broad, secondary pinnæ 1–2 in. by ¾–1 in., those on the lower side of the rachis the largest, naked on both sides, shining above; pinnules ovate, oblong, rounded, ⅓–⅔ in. long, base unequal, obliquely truncate on the lower side, broadly lobed on the margin; veins pinnate in each lobule, not reaching the edge; sori terminal, large 1–2 on the lowest superior veinlet of each lobe. Very much like *Aspidium laserpitiifolium* Mett., except that the stipes are longer, the pinnules larger and not imbricate, the indusium totally absent; its position is near *P. Hasseltii*."

P. (*Dictyopteris*) *difforme* Bl.
P. subevenosum Baker.
**P. hirtellum* Bl.
**P. cornigerum* Baker.
P. cucullatum Nees.

***Polypodium triangulare** (Scort.). Rhizome erect, short, covered with scales; fronds tufted, subsessile, linear, attenuated at both ends, 6–8 in. by ¼ in. thick, coriaceous, glabrous, whitish beneath, cut down to the rachis into thick, distichous, triangular segments, which are obtuse when barren and acute when fertile, convex above, flat on the lower surface; veins hidden; sori sunk in a deep pit towards the apex of the superior triangular segments, the lamina on both sides at the apex being folded inwards. (Plate 278, fig. 1).

P. khasyanum Hook.
P. fuscatum Bl.
P. decorum Brack.
P. obliquatum Bl.
P. subfalcatum Bl.
**P. papillosum* Bl.
**P. tenuisectum* Bl.
P. (*Goniophlebium*) *subauriculatum* Bl.
P. (*Goniophlebium*) *verrucosum* Wall.
**P.* (*Goniophlebium*) *Korthalsii* Mett.
P. (*Niphobolus*) *adnascens* Sw.
P. (*Niphobolus*) *acrostichoides* Forst.
P. (*Niphobolus*) *stigmosum* Sw.
P. (*Niphobolus*) *nummularifolium* Mett.
P. (*Niphobolus*) *fissum* Bl.
P. (*Niphobolus*) *penangianum* Hk.
P. (*Pleopeltis*) *accedens* Bl.
P. (*Pleopeltis*) *Wrayi* Baker in Journ. Bot. July, 1887, 206.
P. (*Pleopeltis*) *stenophyllum* Bl.
P. ,, *longifolium* Mett.
P. ,, *angustatum* Sw.
P. ,, *superficiale* Bl.
P. (*Pleopeltis*) *superficiale*, ? var. only a poor specimen.
P. (*Pleopeltis*) *sinuosum* Wall.
**P.* ,, *rupestre* Bl.
**P.* ,, *platyphyllum* Sw.
P. ,, *irioides* Lam.
P. ,, *musæfolium* Bl.
P. (*Pleopeltis*) ? sp. near *membranaceum*, but with the rachis shining black.

P. (*Dipteris*) *Horsfieldii* R. Br.
P. ,, *bifurcatum* Baker.
P. (*Pleopeltis*) *hastatum* Thunb.
P. ,, *incurvatum* Bl.
P. ,, *Phymatodes* L.
P. ,, *nigrescens* Bl.
P. ,, *longissimum* Bl.
P. ,, *palmatum* Bl.
**P.* (*Drynaria*) *Heracleum* Kze.
P. ,, *Linnæi* Bory.
P. ,, *rigidulum* Sw.
**Monogramme paradoxa* Fée.
Gymnogramme (*Stegnogramme*) *aspidioides* Hk., var. with the fertile fronds much contracted
G. (*Syngramme*) *fraxinea* Don.
G. ,, *Wallichii* Hk.
G. ,, *alismæfolia* Hk.
G. (*Selliguea*) *lanceolata* Hk.
G. ,, *involuta* Hook.
G. ,, *Feei* Hk.
**G.* ,, *Hamiltoniana* Hk.
Meniscium triphyllum Sw.
M. salicifolium Wall.
M. cuspidatum Bl.
Antrophyum nanum Fée.
A. reticulatum Kaulf.
A. semicostatum Bl.
A. latifolium Bl.
Vittaria elongata Sw.
V. falcata Kze.
**V. sulcata* Kuhn.
V. lineata Sw.
V. scolopendrina Presl.
Tænitis blechnoides Sw.
Drymoglossum piloselloides Presl.
Acrostichum (*Elaphoglossum*) *conforme* Sw.
A. (*Stenochlæna*) *palustre* L.
A. ,, *sorbifolium* L.
A. (*Polybotrya*) *appendiculatum* Willd.
A. (*Gymnopteris*) *variabile* Hk.
A. subrepandum Hook.
A. (*Gymnopteris*) *minus* Mett.
A. ,, *spicatum* L.
A. ,, *conitaminans* Wall.
A. aureum L.
A. (*Photinopteris*) *rigidum* Wall.
A. ,, *drynarioides* Hook.
Platycerium biforme Bl.
Schizæa malaccana Baker.
S. dichotoma Sw.
**S. digitata* Sw.
Lygodium dichotomum Sw.
L. flexuosum Sw.
L. microphyllum Br.
Angiopteris erecta Hoffm.
**Kaulfussia æsculifolia* Bl.
Ophioglossum reticulatum L.
O. pendulum L.
Helminthostachys zeylanica Hook.

Explanation of Plate 278.—Fig. 1. *Polypodium triangulare* Scort.; 1 *a*, apex of segment enlarged, showing immersed sori. Fig. 2. Pinnules of *Alsophila obscura* Scort.; 2 *a*, segment enlarged; 2 *b* & 2 *c*, sorus magnified.

RARE PLANTS FROM COUNTY TYRONE.

By H. C. Hart, B.A.

Whilst visiting friends in the fertile Vale of Clogher I was enabled, though somewhat late in the season, to find a few plants in the beautiful woods of Favour Royal and the neighbourhood, which are worthy of record.

**Chelidonium majus* L. Roadside near Cecil, between Ogher and Fintona.

Cardamine amara L. Shady places by Derrygorry Brook in

Favour Royal. This is a very rare species, and is found in only a few localities in the north-eastern portion of Ireland.

**Saponaria officinalis* L. Roadside at Cecil, between Ogher and Fintona.

Euonymus europæus L. By the Blackwater in Favour Royal.

Prunus Padus L. Woods at Favour Royal.

Myriophyllum verticillatum L. In Derrygonnelly Brook, Favour Royal.

Gnaphalium sylvaticum L. Favour Royal, by the Blackwater.

[*Tanacetum Balsamita* L. In disused ground by a cottage at Favour Royal, apparently established. I mention this species ("Alecost" or "Costmary"), as it is not often seen in Ireland. It is native in the Orient, and scarcely met with in the wild state in Europe. It has a very strong balsamic smell in its leaves, and was formerly much used for culinary purposes, though now almost entirely discarded. I have met with it also near Howth, Co. Dublin.]

Veronica montana L. Woods at Favour Royal.

Lysimachia vulgaris L. By the Blackwater near Killybrick.

Neottia Nidus-avis Rich. Wood at Favour Royal above the left bank of the little Derrygorry Brook. This is a scarce species in Ireland, but it is easily overlooked.

Epipactis latifolia All. Favour Royal, in several places.

Sparganium minimum Fries. Fymore Lake, Favour Royal.

Potamogeton gramineus L. Deep drains into Fymore Lake, Favour Royal. Very seldom met with in Ireland.

Scirpus sylvaticus L. By Derrygorry Brook, Favour Royal.

Carex strigosa Huds. With the last, and in woods elsewhere at Favour Royal. A very scarce plant in Ireland.—*C. pendula* Huds. By Derrygorry Brook, Favour Royal. Very rare in the north of Ireland.—*C. lævigata* Sm. Common in the Favour Royal woods. —*C. vesicaria* L. Fymore Lake, Favour Royal.

Milium effusum L. Woods at Favour Royal, especially at Derrygorry.

Equisetum maximum Lam. Derrygorry Brook.

Hymenophyllum tunbrigense Sm. Alt-na-diaoul, near Favour Royal.

The above all belong to District X. of the 'Cybele Hibernica,' and several are additions to its Flora. The area in which they are found will no doubt yield more rarities, as it has never been botanised. I hasten, however, to record these, lest they should escape my memory.

I may mention here that at Castlecoole, near Enniskillen, in Fermaugh, which is also in District X. of the 'Cybele Hibernica,' I obtained the following few local species in the spring of 1886:— *Alliaria officinalis*, *Arenaria trinervia*, and *Lemna trisulca*.

SUPPLEMENT TO NOTES ON RUBI.—No. 2.

By Charles C. Babington, M.A., F.R.S.

I have recently received, through the kindness of its author, a very valuable and interesting paper entitled "Some observations on the Genus *Rubus*. Pt. 1. Comparative examination of the Rubi in the Scandinavian Peninsula," by F. W. C. Areschoug, Ph.D., Professor in the University of Lund, 1885–86. It is extracted from the 'Lunds Univ. Arsskr.' tom. xxi., and is written in English. The perusal of it has led me to write the following comments upon its contents.

I must remark in the first place that it is far too thoroughly pervaded by the theory of Evolution to be quite satisfactory to those who continue to look upon that as a *theory rather than a fact*. It is most interesting to read the observations and conclusions arrived at by so competent an observer when looking at the subject from that point of view, even when we are not prepared to accept all his conclusions. Doubtless the Rubi present almost insuperable difficulties, but it does not seem to me that Evolution removes them. I incline to the opinion that there are a considerable number of distinctly separate forms (call them species if you please, but we do not know how to define the term) which have varied greatly, and in a few (I believe only a very few) cases have hybridised. Focke has attempted with more or less success to discover these original forms as they appear in Germany. Genevier did not attempt it for France. The former has arranged the existing forms in accordance with such views; the classification of the latter often widely separates closely-allied plants, and is avowedly artificial. The colour of the floral organs is now allowed to be a very important character when used in connection with others; but difference solely in the colour of the petals does not seem to be a sufficient reason for the separation, often distantly, of closely-allied plants. Yet Genevier made the colour of the petals a prominent part of his classification. Focke gives great and deserved weight to the colour of the flowers, but has avoided what I consider to be the error of Genevier.

To the speculative botanist the peculiar interest of Areschoug's work is the observations on the origin of the plants: to the descriptive botanist the most marked point is the elaborate dissertation concerning *R. corylifolius* and its Scandinavian forms, which occupies sixty-five pages. He includes under that name our *R. Balfourianus*, and would probably place there our *R. deltoideus* and *R. scabrosus* if they grew in Scandinavia. The forms so grouped do not seem to be very common in our northern regions: *R. Balfourianus* has been gathered in Perthshire by Dr. Buchanan White, and also *R. corylifolius* var. *conjungens* Bab. Our northern botanists ought to study this treatise, and inform us if the forms described in it occur in Scotland. Materials for doing so have not come under my notice. Their alliance with the *Suberecti* does not

strike me; but my *R. latifolius*, which I place amongst the *Rhamnifolii*, does in appearance greatly approach our *R. corylifolius*, which is hardly that of Scandinavia. *R. latifolius* is a plant concerning which we require more information. It seems more nearly allied to the *Rhamnifolii* than the *Cæsii* (*Corylifolii* of Areschoug). It has not as yet been noticed in more than three of the Watsonian districts, all in the east of Scotland, and is very rare in them.

Apparently also Areschoug would place our *R. diversifolius*, with which he would combine our *R. fusco-ater*, in his aggregate species *R. corylifolius*. He considers them to be closely allied to *R. bahusiensis* and *R. dumetorum*, which he tells us are essentially glandulose (setose), but that other forms of his *R. corylifolius*, such as *R. ferox* Arrh. and *R. acutus* Lindb. are subglandulose. I have not seen authentic specimens of these, and so cannot form any judgment concerning them.

The conclusion from all this seems to be that our *R. corylifolius*, especially as represented by the typical form *R. sublustris* Lees, and its British allies, does not well fall in with Areschoug's arrangement of these northern plants. Perhaps some of his forms may yet be found in the north of Scotland, from whence but few Rubi are recorded or preserved in our herbaria, although Dr. Buchanan White's herbarium would greatly help in removing this ignorance as far as Perthshire is concerned.

Mr. Fridericksen is stated to have said that "individuals which were very little glandulose before, and which have been hewn down and grown up again, are abundant with glandules." Unfortunately Mr. Fridericksen's papers are written in Danish, which is a language I do not understand. But if he has made such observations, which I consider very difficult to make and producing results contrary to what I believe to be the fact, they are of extreme importance. They would, if proved, tend to totally change some of our prevalent ideas concerning Rubi.

But there is another conclusion which may probably be arrived at, namely, that our original *R. corylifolius* is one aggregate species; and the northern *R. corylifolius*, with all its allies, including probably our *R. Balfourianus* and *R. scabrosus*, is another, which may perhaps claim the name of *R. nemoralis* Aresch., but not the *R. nemoralis* of southern botanists. It is the *R. milliformis* of Fridericksen and Gelert ('Danmarks og Slesvigs Rubi,' p. 108). This seems to be the conclusion at which Areschoug has arrived, and it accords very well with the views of British botanists. Our *R. sublustris*, and the forms which I have combined with it as the *R. corylifolius* Sm., are not noticed by Areschoug, and do not seem to grow in Scandinavia.

We will now turn to another difficult group, namely, the plants included under the original *R. glandulosus* Bell. I possess a good series of specimens of *R. Bellardi* from Jutland and Sleswig (Lange), Smoland (Arrhenius), Germany (G. Braun and Focke), France (Genevier, Billot, and Boulay), the Rhine Provinces (Wirtgen). All of these seem to me to accord very fairly with our *R. Bellardi*. Areschoug justly remarks that the prickles are in some

cases very rare, and that one might almost describe the stem as only aciculate and setose. Such is often the case with our *R. Bellardi*. He appears to have seen only *R. hirtus* when in England, but admits that "not improbably the English form is analogous with the continental *R. glandulosus*." I believe that such is the case, and that the Scandinavian forms are rather different. He justly remarks, "I have some reason for suspecting that many of the English forms that have been identified with continental forms are . . . analogous forms." In this I quite agree with him, and should even go farther and say that the forms found in the S.W. of England are analogous to, but not exactly identical with, those of our northern counties and Scotland. Each district not only seems to have its own especial and prevalent species, but the forms found near the S.W. coast are usually slightly different from those growing in central England, and those again from forms found in the northern half of Scotland. The differences are very slight, but are apparent to the practised observer. It becomes every day more difficult to decide upon the rank to be justly claimed by each so-called species or variety.

Genevier agrees with me in placing the *R. dentatus* Blox. as a form of *R. Bellardi*, but he also places with it a plant from Baker (*R. glandulosus*, cult. ex hort. Kew, 1867), which can hardly be the same, for it has the many strong although short unequal prickles and strong short aciculi of the *Koehleriani*.

Areschoug justly remarks under *R. pallidus* that the plant to which we give that name has no right to it, and that it seems to be a form of *R. Koehleri* growing probably in shade, as Focke suggests. He says that our *R. pallidus* "is of the same species as [our] *R. Guntheri*," and adds that it is "identical with *R. foliosus* Whe." I cannot agree with his determination, and must suppose that we have different plants in view.

Areschoug considers *R. horridus* Hartm. as of especial interest. It is a Scandinavian plant of which I unfortunately have very little knowledge, and do not possess any authentic specimens. He justly remarks that our *R. infestus* differs slightly from that of Germany by having more hair under the leaves, not felt. I only know this plant by the possession of a specimen from Volmardinsen, a station mentioned by him; and others from Genevier, which seem to accord with it. These also seem to agree very well with two specimens from Hartshill, called *R. infestus* of Bloxam, which Genevier has accepted as the true plant.

I have not seen *R. polyanthemos* Lindb., which is said to be the "most vigorous of all the Scandinavian brambles." It is considered by Areschoug to be the English *R. umbrosus* (the *R. carpinifolius* of Bloxam). It is therefore probable that his *R. polyanthemos* is the same as *R. Maassii* Focke, and probably also *R. Münteri* Marss. I may not be right in supposing that he includes them both, as I have erroneously done under my *R. umbrosus*; but my present idea is that many of our *R. umbrosus* are *R. Maassii*, and a few of them *R. Münteri*. And I should place them all near to *R. rhamnifolius*, as is done by Focke and Baker. I do not know

the date of publication of the name *R. polyanthemos*, but *R. Maassii* was published in 1876. I find what I believe to be *R. Müinteri* in my herbarium from Jardine Hall (Dumfr.), and Llanberis (Caern), gathered by myself, from Keswick by Dr. Hort, and Twycross by Mr. Bloxam. Areschoug says that he gathered his *R. polyanthemos* at Hillingdon (Middlesex), Wimbledon (Surrey), and Plymbridge (Devon), and that Baker sent it to him from Chertsey (Surrey), and Briggs from several places in Devonshire. Areschoug places *R. polyanthemos*, *R. insularis* Aresch., and *R. Lindebergii* Müll. amongst the *Discolores*, thus taking a very different view from that which is usual with British botanists, and from what I do now.

I have not seen *R. insularis*, but the specimen of *R. Lindebergii* in the 'Rubi exsicc. Dan.' No. 7, does not seem to me to agree well with the *Discolores*. The *R. Langii* Jensen, No. 9 in the same beautiful collection, is stated by Areschoug to be a form of *R. Lindebergii*. English botanists would, I think, agree to place these three plants, *R. Müinteri* (*polyanthemos*), *R. insularis*, and *R. Lindebergii*, under one name, as I am now inclined to do, and to adopt *R. Müinteri* as that name, and to separate from them *R. Maassii*, placing both *R. Müinteri* and *R. Maassii* close to *R. rhamnifolius*, as is done by Focke; for I think that they must be removed from proximity to *R. macrophyllus*.

We have had much difficulty with *R. cordifolius*, and Areschoug considers it to be the *R. Müinteri*, but that can hardly be the case. Focke joins it to *R. rhamnifolius*, as we have been accustomed to do. I have recently placed it under *R. affinis*, and that continues to be my opiniōn.

Areschoug separates a plant from his *R. cordifolius* under the name of *R. velatus* Aresch. His *R. cordifolius* is placed in close proximity to *R. villicaulis*, and he states that it has "foliis subtus pubescentibus et pallide viridibus vel subcanescentibus," characters which would seem to separate it from *R. rhamnifolius*, and also from *R. affinis*. I know nothing of *R. velatus* beyond what can be learned from the description. From that it appears that it differs by the cordate-ovate longly acuminate terminal leaflet, in *R. cordifolius* the leaflet being orbicular and cuspidate. The leaves are also felted beneath. I cannot see its similarity to the Danish *R. dumosus* Lefvre., which much resembles our *R. affinis*, having its compound panicle of not the "inflorescentia subsimplici" of *R. velatus*.

Areschoug has not seen *R. sulcatus* from Britain, but his plant appears to be the same as that which Dr. Buchanan White has sent me from Perthshire. Probably it will be found in other parts of the north. I have described it in my "Notes" in Journ. Bot. 1886, 217.

R. nitidus was sent to Areschoug by Mr. Briggs from "Cornwall as well as Devonshire," and I am glad to find that he agrees with me in placing *R. ramulosus* under *R. nitidus*.

The Swedish plants named *R. fruticosus* (usually known as *R. plicatus*), *R. suberectus*, and *R. fissus* are acknowledged to be the same as the British plants which bear those names.

I may take this opportunity to state that our *R. thyrsoideus* from Cornwall seems to be exactly the subordinate species named *R. fragrans* Focke, which I have now before me through the kindness of Dr. Focke (Rub. Select. 59), unless the colour of the flower is different in the two brambles. I have described the petals as white, which may not be correct, as I have not seen the living plant. The colour of the petals seems to vary amongst the plants included under *R. thyrsoideus* by Focke; but he states that those of *R. fragrans* are purple. The Tamerton Folliott plant does not accord with either of the other forms included by Focke under his aggregate *R. thyrsoideus*.

Areschoug remarks, concerning our *R. Leesii* (p. 169), that it "grows in more places in our country than in any other European country, although everywhere it is very scanty, and probably has already disappeared from several localities." It would appear therefore to be sterile there, as it is in Britain, and I believe in every place where it has been found.

As already stated, I am not inclined to follow Areschoug into his speculations about the origin of the species, which he has elaborated in great detail in this essay. That within certain narrow limits each species may vary so as to produce tolerably permanent forms, which those botanists who go by the somewhat opprobrious name of "splitters" describe as species, is, I believe, the case. But that the pedigrees worked out by Areschoug for many of the plants will hold good, I am far from being able to believe. It is interesting to see that so careful an observer does not adopt the hybridising theory now so prevalent in Germany.

In concluding my remarks founded upon this very interesting essay, I cannot but praise it most highly, although I do not agree with many of the deductions and theories contained in it. We want many such elaborate dissertations. It does seem to me that at present we do not possess sufficient materials to enable us to determine what aggregate species we have in Britain; and that our present duty is to collect the materials for our successors to use in the grouping of the segregate forms into aggregate ones.

There is another apparently very valuable paper before me: it is the 'Danmarks og Slesvigs Rubi,' of K. Fridericksen and O. Gelert. It would be especially useful if it was not written in Danish, being illustrated almost throughout by the very beautiful specimens contained in the 'Rubi exsiccati Daniæ et Slesvigiæ' of the same authors. As far as I can understand them the remarks contained in this essay possess great interest. Alas! they are almost unintelligible to me.

I may take this opportunity to state that Focke has shown that Mr. Linton's *R. lætus* must again change its name. *R. lætus* has been already used, as Focke informs Mr. Linton, by Progel in 'Bericht d. Botan. Vereins.' Z. Landshut (1882), p. 20. He calls it *R. Lintoni* Focke, and I think that we ought to adopt that as its name. The description of it under the name of *R. lucens*, another preoccupied name (it having been used for an Indian plant), will be found on p. 82 of this volume of the Journal of Botany.

PS.—Genevier has placed in his herbarium a specimen from Baker (Thirsk, Aug. 12th, 1865), with the name of *R. nemoralis* Müll. Baker appears to have sent it without any name. It agrees in nearly all respects with Genevier's specimens, and he seems to have had no doubt about its name. I possess what I believe to be the same plant, also gathered by Baker, and distributed by the Thirsk Exchange Club, from Hartley Links, Northumberland, August, 1862. It was then called *R. rhammifolius*. I had placed it with *R. mucronatus*, which can hardly be its true place. Genevier considered *R. nemoralis* to be nearly allied to *R. Sprengelii*, that is, I suppose, to our *R. Borreri;* but its panicle and leaves seem clearly to separate it from that plant. It somewhat approaches *R. Colemani*, which Bloxam thought was the true *R. infestus*, which I quite think is not the case. I am inclined to place it next to *R. Colemani*, as a form distinct from that so-named.

Dr. Buchanan White sends me a bramble which seems to agree with the *R. ammobius* Focke. He finds it near Perth. It differs from *R. plicatus*, according to Focke's description, by having "turionibus teretiusculis superne obsolete angulatis." The Perth specimen has an exactly square (tetrangular) stem. Focke's specimens have the stem 5-angular. I define it:—

R. AMMOBIUS Focke; stem erect-arcuate angular; prickles small, short, declining from a long compressed base; leaves quinate; leaflets scarcely at all plicate, not felted, but hairy on the veins beneath, *very finely dentate-serrate; term. leaflet* broadly cordate-ovate, acuminate, basal leaflets subsessile, lateral leaflets of the flowering shoot ovate, but rather dilated externally; flowers in a long leafy panicle, rachis and peduncles subglabrous, fruit-sepals reflexed, petals pale rose-colour, stamens white, exceeding the greenish styles. The prickles are very short, their length about equalling the extent of their compressed base. The upper leaves are sometimes 7-nate. Sepals leaf-pointed, dark green externally. "Young leaves white-felted beneath."

This is not very satisfactorily determined. Focke's description (p. 118, it is omitted in the index) does not agree very well with his specimen now before me (from Burgsteinport, Aug. 10th, 1876), especially in the shape of the stem. The panicle of our plant is very narrow, but long: it is much shorter and broader on that specimen.

Our plant grows on an island in the River Tay near Perth, where it was found by Dr. Buchanan White in 1886.

It may be convenient to British botanists if I add definitions of *R. Maassii* Focke and *R. Münteri* Marss.:—

R. MAASSII Focke. Stem much arcuate, angular (with flat sides), subglabrous; prickles slender, declining from a broad compressed base. Leaves 5-nate; *leaflets finely but doubly serrate*, convex, velvety or slightly felted beneath; *term. leaflet broadly obovate-cuspidate; panicle* with few slender declining or deflexed prickles, hairy, *not setose*, leafy below, its lower branches racemose, short, ascending, its upper ones simple or corymbose but few-flowered; term. peduncle shortest; sepals triangular-attenuate, with a linear

point, unarmed, reflexed; stamens exceeding the styles, germens glabrous. The sepals are green externally, with a whitish margin.

R. Münteri Marss. is similar to *R. Mausii* in most respects, but its *stem is sulcate* (5-quetrous, not 5-angular), *leaflets rather more coarsely serrate, term. leaflet suborbicular-acuminate.*

I am far from being sure that these two plants ought not to be combined, but Focke keeps them decidedly distinct.

REMARKS ON THE NOMENCLATURE OF THE EIGHTH EDITION OF THE 'LONDON CATALOGUE.'

By B. Daydon Jackson, Sec. L.S.

(Concluded from p. 314.)

1241. *Hippophaë Rhamnoides* L. — The pre-Linnean name was *Rhamnoides*, hence the capital letter.

1243. "Is it certain that *Thesium linophyllum* L. is the same as what is known as *humifusum* DC.?"—*Mr. Roper.* Nyman assigns the Linnean species to *T. montanum* Ehrh. and *T. intermedium* Schrad., neither of which is British; whilst he quotes "Angl." only under *T. humifusum* DC., which he separates widely from the others.

1246. *Euphorbia platyphyllos* Linn. Sp. Pl. ed. 1, 460, altered in ed. 2, 660, to *platyphylla* (*Tithymalus platyphyllos* Fuchs.).

1251. *E. pilosa* L. — "The census number is 1. I have Mr. Hemsley's Sussex specimen, which is quite distinct from the *pilosa* from Bath sent by Mr. Flower. In fact I consider the Sussex plant to have lunate glands."—*Mr. Roper.*

1263. *Ulmus montana*, not Sm., but Stokes in With. Bot. Arr. ed. 2, i. 259 (1787).

1274. *Alnus glutinosa*, not Linn., but Gaertn. Fruct. ii. 54.

1280. *Salix pentandra* L. × *cuspidata* (Schultz). — "Why not *S. Meyeriana* Rostk. (1796)?"—*Mr. Druce.*

1320. *Taxus baccata* b. *fastigiata* (Lindl.).—The use of *fastigiata* as a varietal name will be found in Loudon, Encyc. Trees, 939 (1842).

1340. *Epipactis latifolia* Auct.—"Koch, Babington, and Nyman give, All. [Fl. Ped. ii. 152]."—*Mr. Roper.*

1345. *Orchis hircina* Sw. in Stockh. Nya Handl. (1801), 207.—An earlier publication is Scop. Fl. Carn. ed. 2, 193 (1772). The first edition of Scopoli's 'Flora' has not the binomial nomenclature.

1349. *O. militaris* L. — "The Linnean species was made up of two or three plants; why not adopt *O. Rivini* Gouan? unless the plant of Fl. Suec. be considered as restricted *militaris*."—*Mr. Druce.*

1373 is misprinted 1873.

1375. *Crocus vernus* All. Fl. Ped. i. 84. — "Nyman gives Wulf. in Jacq. [Fl. Austr. Supp. 47] (1778). Jacquin quotes *C. vernus* L. as a synonym, but Maw, in his 'Monograph,' says, not Linnæus."

—*Mr. Druce.* Linnæus had no species *vernus*; his species *C. sativus* Sp. Pl. ed. 1, is divided into two varieties, *α. officinalis* and *β. vernus*.

1380. *Narcissus Pseudo-narcissus*, b. *lobularis* Haw. — "Did not Haworth describe this as a species of *Ajax?*"—*Mr. Druce.*

1390. *Asparagus officinalis*, a. *hortensis* Lond. Cat., and b. *prostratus* Dum. — "Is there any need to discard the varieties given in the Sp. Pl. of var. *altilis* and var. *maritimus* for these later and not more descriptive names? Gouan calls the first var. *sativus* in Hort. Monsp."—*Mr. Druce.*

1400. *Allium vineale*, a. *capsuliferum* Syme. — "Does this differ from the plant of Koch?"—*Mr. Druce.*

1401. *A. oleraceum*, b. *complanatum* Fries (1814). — Mr. Druce points out that the foregoing is preferable to (Bor.) as the authority.

1419. *Gagea fascicularis* Salisb. in Kön. & Sims, Ann. Bot. ii. 555 (1806). — The genus was established by Salisbury with seven species, ours being one, founded on *Ornithogalum luteum*. The propriety of the genus being universally acknowledged the rule of observing the first name in the right genus requires the retention of *fascicularis*, to the exclusion of the subsequent *G. lutea* Roem. et Sch. See Journ. Bot. 1884, 211.

1425. *Juncus bufonius* var. *fasciculatus* Koch. Syn. ed. 1, 732 (1837) is clearly anterior to Bertol. Fl. Ital. iv. 190 (1839), although Babington and Nyman adopt the latter.

1433. "*J. glaucus* Ehrh. 1791. The Linnean *inflexus* was made up of two species, but Leers's plant appears to be the same as *glaucus*."—*Mr. Druce.* *J. inflexus* Leers Fl. Herborn. 87 (1775); gives as a synonym Hall. No. 1311 *a*.

1439. *J. supinus* var. *Kochii*. — As pointed out by Mr. Druce, Bab. Man. ed. 6, 352 (1867) is an earlier authority than Syme.

Var. *fluitans* Fries, Nov. ed. 2, 92 (1828), syn. *J. fluitans* Lam. Encycl. iii. 270 (1789).

Var. *uliginosus* Fries, *l. c.* 91 (1828), syn. *J. uliginosus* Roth, Tent. i. 155 (1788).

1444. *J. castaneus* Sm. Fl. Brit. i. 383 (1800), will not be superseded by *J. triceps* Rostk., which was published in the following year.

1449. *Luzula vernalis* DC. Fl. Fr. iii. 160 (1805) precedes *L. pilosa* Willd. Enum. 393 (1809).

1454. *L. erecta* Desv. Journ. Bot. i. (1808), 156, is earlier than *L. multiflora* Lej. Fl. Spa, 169 (1811).

1457. *Sparganium ramosum* Huds. Fl. Angl. ed. 2, 401 (1778); Curt. Fl. Lond. fasc. 5, tab. 66. — This seems to me a better way of indicating the true state of things, than by citing Curtis as the author of the species in question.

1470. Afzelius is the author of *Alisma lanceolatum* in With. Nat. Arr. ed. 3, ii. 362, but it occurs as a varietal name in Syme, Eng. Bot. ed. 3, ix. 70.

1473. *Sagittaria sagittifolia* Linn. Sp. Pl. ed. 1, 993, so spelled; I am not aware of any author who writes the specific name "*sagittæfolia*," but *sagittæfolia* is a later name, to be frequently found, particularly in French Floras.

1474. *Damasonium stellatum* Pers. Syn. ii. 400, has no mention of Richard, although it is well known that he largely contributed to this work, yet he would not permit his name to appear on the title-page, because of its Linnean order. He cannot therefore be cited as the author of any species or genus which is not specially associated with his name.

1483. *Potamogeton rufescens* Schrad. ap. Cham. Adn. ad Kunth, Fl. Berol. 5 (1815). — "Nyman and Syme give an earlier name, *P. alpinus* Balb. [Misc. Bot. i. 13], 1804."—*Mr. Druce.*

P. coriaceus Nolte will of course be inserted in the next edition; see Journ. Bot. xxiv. (1886), 223.

Eleocharis R. Br. Prod. 224 (1810); *Heleocharis* Lestib. Ess. Cyp. 41 (1819). Brown, in founding the genus, forgot to render the rough breathing of the Greek, but that was supplied by Lestiboudois nine years later. Until comparatively recent times it was considered a proper course to correct or alter, under the guise of correcting, any name which was not approved by the emendator; this was carried to ludicrous excess, wrong derivatives being sometimes ascribed. A far less dangerous plan, and one which has few drawbacks in application, is to use the name as originally spelled, and to that form, add the plants described under trifling variations of generic names. The comfort of this method will be chiefly felt when generic names of uncertain, commemorative, or barbarous origin are in question. *Roupala* Aublet and *Argythamnia* Browne are instances of these cases.

1524. *Eleocharis uniglumis* Reichb. — First published as *Scirpus uniglumis* Link in Jahrb. Gew. i. (3) 77 (1820). *Heleocharis uniglumis* Reichb. Fl. Exc. 77 (1832).

1528. *Scirpus parvulus* Roem. et Sch. Syst. ii. 124 (1817).—An earlier name is *S. nanus* Spreng. Pug. i. 4 (1813). A previous *S. nanus* Poit. Encyc. vi. 759 (1804) is now sunk in *Fimbristylis argentea* Vahl.

1530. *S. Savii* Seb. & Maur. Fl. Rom. Prod. 22 (1818) is antedated by *S. numidianus* Vahl, Enum. ii. 254 (1806). The latter name is an unlucky one for a plant which is widely distributed over the globe. I have to thank Mr. C. B. Clarke for calling my attention to this and the previous case.

1535. *Scirpus carinatus* Sm. Comp. 10. — Erroneously ascribed to Linnæus.

1538. *S. maritimus* var. *compactus* Koch, Syn. ed. 2, 858 (1843), with a reference to Krocker, Fl. Siles. i. t. 15 (1787), which, however, has no such name, the plate having this legend only:—"S. m. exemplar varietas minor." It was treated as a species by Hoffmann, Deutschl. Fl. ed. 2, i. 25 (1800).

1541. *S. rufus* Schrad. Fl. Germ. i. 133 (1806), is earlier than Wahlenb. Fl. Lapp. 15 (1812).

1544. *Eriophorum angustifolium* Roth. — "Var. b. *elatius* Koch [Syn. ed. 1, 745 (1837)], *longifolium* Hoppe [Dec. Gram. 1, n. 9 (1819)] appears to be an earlier name for this variety, as does var. *alpinum* Gaud. [Fl. Helv. i. 131 (1828)] for the var. *minus* Koch [*op. cit.* 746]."—*Mr. Druce.*

1548. *Rhynchospora alba* Vahl. — Mr. Roper asks why var. *sordida* Syme is left out?

1556. *Carex rupestris* All. — Nyman has Bellardi instead of Allioni; but, as Mr. Druce observes, Bellardi is the authority for the locality, not the name, in 'Flora Pedemontana.'

1572. *C. teretiuscula* Good. in Trans. Linn. Soc. ii. 163 (1794). *C. diandra* Schrank, Bot. Ann. 57 (1781).—"An earlier but badly descriptive name."—*Mr. Druce*. "Nomen erroneum."—*Nyman, Consp.* 782. "Nomen infaustum."—*Pryor, Fl. Herts*, 446 (ined.), who does not adopt it, although a staunch upholder of priority.

1567. *C. muricata* var. *pseudo-divulsa* Syme. — Mr. Druce asks if this variety differs from *virens* of Koch or Lamarck. The references are, *C. virens* Lam. Encyc. iii. 384 (1789), as a species; Koch, Syn. ed. 1, 751 (1838); and as a variety, Koch, Syn. ed. 2, 806.

1572. This was originally published by Weihe as *C. Boenninghausiana* in Flora (1826), 743; altered by Kunth, Enum. iii. 404, to *Boenninghauseniana*.

1575. "*C. lagopina* Wahlb. 1803, or *approximata* Hoppe, 1800; Nyman says, 'sed ab auctore ipso depositum,' but why not *Carex bipartita* Allioni?"—*Mr. Druce*. These names were published, Wahlenberg's in Stock. Nya Handlingar (1803), 145; Hoppe ex Hoffm. Fl. Deutsch. ed. 2, ii. 200; Allioni, Fl. Pedem. ii. 265 (1785).

1580. "*C. Buxbaumii* Wahlb. 1803, or *C. subulata* Schum. (1801) = *C. polygama* Schk."—*Mr. Druce*. Schkuhr's name will be found in his Riedgraeser, i. 84 (1801).

1584 and 1585. Laestad. is misprinted Laestid.

1588. *C. glauca* is ascribed to Murray, following Nyman's error; the authority is Scop. Fl. Carn. ed. 2, as usually cited. The varieties would be more correctly given as *C. Micheliana* Syme and *C. stictocarpa* D. Don; but Mr. Druce points out that *C. flacca* Schreb. Spic. App. (1771) precedes Scopoli by one year.

1598. *C. præcox* Jacq. Fl. Austr. v. 446, non Schreb. — An earlier name is *C. verna* Chaix in Vill. Fl. Dauph. i. 312 (1786); ii. 204 (1787), concerning which Nyman observes, "nomen anterius sed nunc ambiguum et alterum notissimum."

1608. "*C. ampullacea* Good. 1794.—Is not this also the *C. obtusangula* Ehrh. Calam. 1786? The latter name Nyman says is 'minus characteristica.'"—*Mr. Druce*. Nyman seems to allow himself full license for sentiment in retaining or discarding names.

1614. *C. fulva* var. *Hornschuchiana* Bab. — (Hoppe) is not required.

1621. "*C. paludosa* Good. 1794.—*C. acutiformis* Ehrh. 1788, is not a happy, although an earlier, name.—Var. *Kochiana* Gaud. Is this Gaudin's or DeCandolle's variety, and does it differ from *C. spadicea* Roth, 1793, and Elwert Fl. Margrav. 1786?"—*Mr. Druce*. The varietal name will be found in Gaud. Fl. Helvet. vi. 130 (1830).

1624. For *diochroa* read *dichroa*.

1626. For Scop. read Linn. *Panicum sanguinale* was published in Sp. Pl. ed. 1, 57.

1627. *P. glabrum* Gaud. Agrost. i. 22 (1811).—"Is not this the *P. lineare* Krock. [Fl. Siles. ii. 95], 1787? = *P. Ischæmum* Schreb. in Schweig. 1815."—*Mr. Druce*.

1635. "*Leersia oryzoides* Sw. vel Soland. ap. Sw. Fl. Ind. Occ. 1787. — In Pollich's Fl. Pal. [i. 52] 1776, the plant was called *Homalocenchrus oryzoides*; *Ehrhartia clandestina* [Web. in] Wiggers's Fl. Holsat, [63 (1780)], and *Asprella oryzoides* in Lamarck's Ill. [n. 858, p. 167 (1791)]."—*Mr. Druce.* *Leersia oryzoides* was published in Sw. Prod. Fl. Ind. Occ. 21 (1788), without mention of Solander.

1642. *Alopecurus agrestis* Linn. Sp. Pl. ed. 2, 89 (1762), was preceded by Hudson's *A. myosuroides* Fl. Angl. ed. 1, 23.

1656. *Agrostis alba* L.—"It has been suggested that this should be known as *palustris* Huds. What is the plant of Sp. Pl. ed. 1, called *alba*, 'panicula laxa, calycibus muticis æqualibus. Habitat in Europæ nemoribus'? In Hudson's ed. 2 the *A. palustris* of ed. 1 is placed as a variety of *A. polymorpha*."—*Mr. Druce.*

1662. *Gastridium lendigerum* Gaud. Fl. Helv. i. 176 (1828) is antedated by *G. australe* Beauv. Agrost. 21 (1812).

1672. *Corynephorus canescens* Beauv. Agrost. 90 (1812).—"This genus was called *Weingærtneria* by Bernhardi in 1800."—*Mr. Druce.*

1675. *Deschampsia setacea* [F. J. Hanb.], "or *discolor* Roem. & Sch. [Syst. ii. 686 (1817], or *D. Thuilleri* Gren. & Godr. [Fl. Fr. iii. 508 (1855–56)]. — Under the name of *Aira discolor* Thuiller distributed specimens of a variety of *D. cæspitosa*, according to Nyman."—*Mr. Druce.* According to DeCandolle, they are referable to *D. flexuosa*.

1679. *Trisetum flavescens* Beauv. Agrost. 88 (1812), is preceded by *T. pratense* Pers. Syn. i. 97 (1805); see Beauvois's admission in his Index, p. 180.

1685. *Fibichia umbellata* Koel. Gram. 309. — The authority is misprinted Koch.

1686. *Sieglingia decumbens* Bernh. Erf. 44 (1800). *Danthonia decumbens* DC. Fl. Fr. iii. 33 (1805). *Triodia decumbens* Beauv. Agrost. 76 (1812).

1688. *Sesleria cærulea* Ard. Spec. ii. 18 (1764).—Quoted by Scopoli, who should not figure as the author.

1692. *Molinia cærulea* Mœnch, Meth. 183 (1794). — The genus was founded by Schrank, Baier. Fl. i. 334 (1784), who termed this plant *M. varia*; he did not print the generic name *Monilia*, as supposed by a correspondent.

1706. *Poa Balfourii* Parn. Grasses, 66, ex Bab. 145, ex Syme, Man. ed. 1, 367. — The *P. Balfourii* "Bab." of the Lond. Cat. and Syme includes Parnell's *P. montana*.

1707. *P. nemoralis* var. *vulgaris* Gaud. Agrost. i. 179 (1811). —Leers does not appear to have given distinctive names to his varieties.—Var. *glaucantha* Reichb. Fl. Exc. 47 (1830). Var. *cæsia* Gaudin, *l. c.* 184 (1811).

1709. *P. sudetica* Haenke, in Jirasek, Beob. Riesengeb. 120 (1791).—Since the time of Willdenow, this (also *P. laxa*) has been cited as "*sudetica*" by botanists blindly copying the citation given in Sp. Pl. i. 389. "This is given in the 'Student's Flora' as *P. sylvatica* Chaix. 1786; *P. rubens* Mœnch, 1777, appears to be an earlier name. It was called *P. Chaixii* in Vill. Delph. 1785."—

Mr. Druce. I do not find the name *P. rubens* in Mœnch, Enum. Pl. Hass. (1777), but it occurs in the Methodus, 187 (1794).

1720. *Festuca loliacea.* — Concerning this Mr. Druce writes :— "In ed. 1 of Huds. Fl. Anglica this is described as 'F. spicata, spiculis alternis sessilibus compressis muticis. Anglis, Spiked Fescue Grass. Habitat ad vias et in pascuis sed rarius; prope Vauxhall.' In the copy of Hudson which I consulted, Dr. Lightfoot had written against this description, 'a var. of *Festuca pratensis*,' which seems admirably to describe it. I cannot see that it represents the *Sclerochloa loliacea* of Woods, which Hudson in the same edition calls *Poa loliacea;* 'Poa spicata spiculis alternis sessilibus, subsexfloris. Habitat in arenosis maritimis frequens.' Against this Dr. Lightfoot wrote, '*Triticum maritimum* Linn. Syst. Nat. 109.' Hudson quotes the Dillenian Ray synonym for it, 'Gramen pumilum loliaceo simile.' Sir James Smith wrote against this in his copy of the Synopsis, '*Poa loliacea* Buddle.' I therefore fail to see that Hudson is the author of this name, which I expect is meant to represent the *F. rottboelloides* of Kunth [Gram. i. 129], *Glyceria loliacea* H. C. Wats., *Sclerochloa loliacea* Woods, *Triticum* of Smith, *Desmazeria* Nyman, and, as I take it, the *Poa* of Hudson."

1730. *F. elatior* b. *pseudo-loliacea* Hack. ; the authority is misprinted Haeck.—c. *loliacea.* "Is it not also put under *Lolium perenne*, *i. e.* the × *festucaceum* Link?"—*Mr. Druce.* Kunth regards these as the same.—d. *pratensis.* "Auct. or Hudson?"—*Mr. Druce.*

1725. *F. ovina* var. *glauca* Sm. or Lam.

1723. *F. myuros* Linn. hb.—"Nyman says the plant of Sp. Pl. is *F. ciliata* Pers., but Linnæus quotes Morison in ed. 1."—*Mr. Druce.*

1733. *Bromus ramosus* Huds. Fl. Angl. ed. 1, 40 (1762), is an earlier name than *B. asper* Murr. Prod. Gotting. 42 (1770).

1744. *Brachypodium sylvaticum* Roem. et Sch. "1817. Was this not described in 1812 as *B. gracile* by Beauvois?"—*Mr. Druce.*

1746. The genders differ.

1747. *Agropyron* Gaertn. Nov. Comm. Petrop. xiv. (1) 539 (1770). *Agropyrum* Roem. & Sch. Syst. ii. 750 (1817). — Mr. Druce writes that the varieties standing under the names of Mitten, Duval-Jouve, and Syme, were published under *Triticum.*

1752. *A. acutum* non R. & S.—"Is it the plant of Grenier and Godron [Fl. Fr. iii. 605]?"—*Mr. Druce.*

1757. *Hordeum secalinum* Schreb. Spic. 148 (1771). *H. pratense* Huds. Fl. Angl. ed. 2 (1778).

1773. *Asplenium Trichomanes* "Linn. p. p. or Hudson?"—*Mr. Druce.*

1803. *Phegopteris calcarea* Fée, Gen. Fil. 243 (1852), is earlier than *P. Robertiana* A. Br. ex Milde. Fil. Eur. et Atl. 99 (1867).

With this I close the present series of notes, but, as I am compiling a reference-list of British plants, I should be glad of any additional information with which readers may be good enough to furnish me. I should be very glad to know if there is a copy of Bernhardi's Syst. Verz. Erf. (1800) in private hands, which I might consult.

NOTES ON THE FLORA OF BERKS.

By the Rev. W. Moyle Rogers, F.L.S.

I spent last August in Berks. Staying at Beedon, seven miles north of Newbury, I explored the country for five or six miles around; and the following notes give the results of my botanising, so far as those results are supplementary to previously published records for the county. In Mr. Britten's "Contributions to a Flora of Berks," published in the 'Transactions' of the Newbury District Field Club in 1872, the county is divided into five districts. The high road from Newbury to Abingdon, which is the boundary between two of these, "Mid Berks" and "West Berks," cuts the parish of Beedon in two. These notes consequently deal only with the southern portions of these two districts, represented here (as in Mr. Britten's paper) by the respective letters M and W before the several localities. So my remarks as to the rarity or frequency of certain species refer not to the county as a whole, but only to that part of it examined by me between the Ilsley Downs and Newbury. Beedon is about 650 ft. above sea-level, and the whole neighbourhood remarkably high and dry. Hence the almost total absence of wet-land plants in this list. The nomenclature is that of Lond. Cat. ed. 8.

Ranunculus peltatus Schrank. M: Stream, Hampstead Norris. W: Ponds, Beedon and Beedon Common; mostly on mud, and without floating leaves.

Nymphæa alba L. M: Fair Cross Pond, Hermitage; in great quantity.

Papaver somniferum L. Corn-field alien. M: Compton. W: East Ilsley.—*P. Rhæas*, b. *strigosum* (Boenn.). W: Beedon, roadside. — *P. dubium* L. W: Beedon. — b. *Lecoqii* (Lamot.). M: Field between Langley Wood and Sandy Lane; several plants.

Reseda lutea L. M: Frequent. W: Beedon Common.

Viola odorata L. and *V. hirta* L. Common.

Silene Cucubalus Wibel. Common.—b. *puberula* Syme. W: Beedon, in plenty.

Arenaria leptoclados (Guss). M: Westbrook, Hampstead Norris. W: Beedon.

Sagina apetala L. W: Beedon Churchyard.

Hypericum humifusum L. W: Beedon.

Malva moschata L. W: Beedon Wood, &c. Fairly frequent in both districts. — *M. rotundifolia* L. M: Hampstead Norris; East Ilsley. W: Beedon; World's End; Chieveley. Plentiful apparently in all the villages.

Geranium pratense L. W: Beedon Common; Catmore, in plenty.—*G. pyrenaicum* Burm. f. W: Between North Heath and Winterbourne, roadside bank.—*G. pusillum* Burm. f. Frequent.

Euonymus europæus L. Very common.

Rhamnus catharticus L. Locally common. M: Langley. W: Beedon; Catmore.

Acer campestre L. M: Beedon, &c. Exceedingly common in both districts.

Ulex nanus Forster. M: Cold Ash Common. W: North Heath; Snelsmore Common.—No *U. Gallii* seen.

Ononis repens L. Common. — *O. spinosa* L. M: Langley; Ilsley Downs (M and W).

Anthyllis Vulneraria L. W: Between East Ilsley and Beedon; Ilsley Downs (M and W).

Prunus avium L. M: Hermitage; Fence Wood. W: Wood near Snelsmore Common.—*P. Cerasus* L. M: Westbrook Copse.

Spiræa Filipendula L. W: Ilsley Downs.

Rubus Idæus L. Uncommon. M: Westbrook; Fence Wood. W: Copse east of Snelsmore Common; copse, Peasemore.— *R. Lindleianus* Lees. Frequent. M: Langley; Hermitage; Fence Wood. W: Beedon Wood; Catmore; copse, Peasemore.—*R. rhamnifolius* W. & N. Unusually local. M: Hampstead Norris; Cold Ash Common. W: Copse, Peasemore. — *R. rusticanus* Merc. Locally common.—*R. leucostachys* Sm. Very common.—*R. calvatus* Blox. In great quantity on Cold Ash Common (M) and Snelsmore Common (W). Just the plant so frequent in S.W. England.—*R. macrophyllus* W. & N. Local. M: Hampstead Norris; Langley Wood. Typical.—*R. Borreri* (Bell-Salt). M: At junction of Fence Wood and Cold Ash Common. — *R. echinatus* Lindl. Well-marked and frequent. M: Hampstead Norris; Sandy Lane. W: Beedon; Catmore.—*R. Radula* Weihe. Less abundant, but as a rule stouter and more prickly than in S.W. England. M: Langley, Hermitage, &c. W: Peasemore, &c. — *R. Koehleri* Weihe. W: Bushy roadsides between Catmore and Stanmoor; locally abundant. A luxuriant form perhaps coming best under *pallidus* Bab.—*R. diversifolius* Lindl. One of the best marked and most general brambles of the lanes and bushy places in both districts. Especially abundant along the high road for the first five miles out of Newbury towards Abingdon. — *R. flexuosus* M. & L. Very fine and characteristic. M: Westbrook Copse, in immense quantity; Cold Ash Common, near its junction with Fence Wood. W: Copse east of Snelsmore Common. — *R. dentatus* Blox. M: Cold Ash Common, in plenty. — *R. hirtus* W. & N. Locally common. M: Langley Wood; Sandy Lane; Fence Wood. W: Beedon Wood; copse near Snelsmore Common.—*R. corylifolius* Sm., a. *sublustris* (Lees). Frequent. — b. *conjungens* Bab. M: Hermitage. — *R. cæsius* L. Fairly common. The foregoing Rubi records may, I believe, be relied on. Six of them, viz., *calvatus*, *Borreri*, *diversifolius*, *flexuosus*, *dentatus*, and *conjungens* have not (so far as I can ascertain) been before reported from Berks. A few other forms, of which I have collected specimens, will need further study.

Poterium muricatum Spach. Frequent in sain-foin fields. M: Langley; Hampstead Norris. W: Between Beedon and East Ilsley.

Rosa tomentosa, b. *subglobosa* (Sm.). M: Langley; several bushes in one hedgerow. W: Catmore.—f. *sylvestris* (Lindl.). M: Compton, roadside hedge; brought to me by my son, F. A. Rogers.

—*R. rubiginosa* L. Perhaps native in two or three spots. W: Beedon; Chieveley; Snelsmore Common. — *R. micrantha* (Sm.). M: Langley, two or three bushes at intervals in the same hedge with *R. subglobosa*. Not seen elsewhere. — *R. canina* L.—Vars. *lutetiana* and *dumalis*, very common; *urbica*, *arvatica*, *dumetorum*, and *tomentella*, common at Beedon and in the neighbouring parishes. —*senticosa*, M: Compton (found by my son). W: Peasemore.—*frondosa*, M: East Ilsley; Compton. W: Catmore. — *obtusifolia*, M: Compton. W: Beedon Wood border. Between Beedon and East Ilsley; Chieveley. — *andegavensis*, M: Langley Wood border. —*Kosinciana*, W: Peasemore (one bush). — *glauca*, W: Catmore (the only subcristate form seen). — *R. arvensis* Huds. Common. c. *bibracteata*. M: Hampstead Norris. W: Beedon. It will be seen that while *R. arvensis* and the ecristate *canina* forms are well represented in this part of Berks, other roses are remarkably scarce. I looked especially, but in vain, for *systyla* and kindred forms, for *mollis*, and ordinary *tomentosa*.

Pyrus Aria Sm. In hedges and plantations; rather frequent. M: Langley; Westbrook, and elsewhere in Hampstead Norris. W: Between Beedon and East Ilsley. — *P. Malus* L. Common; chiefly *mitis*, but occasionally *acerba*, as in Fence Wood. *Aucuparia* not seen.

Drosera rotundifolia L. M: Fence Wood, in plenty.

Epilobium angustifolium L. Very abundant in several of the woods. M: Langley Wood; Westbrook. W: Wood near Snelsmore Common.

Conium maculatum L. Apparently uncommon. M: Beedon; Langley. W: North Heath.

Apium inundatum Reichb. M: Fair Cross Pond.

Sison Amomum L. W: Locally common, Beedon and Chieveley.

Cornus sanguinea L. Very common.

Viburnum Opulus L. Rare or uncommon. M: Langley, in one spot; Westbrook.

Galium uliginosum L. M: Fence Wood.

Asperula odorata L. Common.—*A. cynanchica* L. W: Catmore; Ilsley Downs (M and W), in great quantity.

Scabiosa Columbaria L. Remarkably common.

Inula Conyza DC. M: Westbrook, in great quantity; and elsewhere in Hampstead Norris. W: Uncommon. Chieveley; Catmore.

Pulicaria dysenterica Gaertn. Uncommon. M: Cold Ash Common. W: Beedon Hill.

Achillea Ptarmica L. Seen only in Fence Wood and on Cold Ash Common (M).

Anthemis nobilis L. Only at Chieveley (W), in the turf of the vicarage lawn.

Tanacetum vulgare L. In one spot only, near a farm in Hampstead Norris (M).

Senecio erucifolius L. M: Cold Ash Common and Hermitage. —*S. aquaticus* Huds. Only at Winterbourne (W).

Arctium majus Schk. W: Winterbourne. — *A. minus* Schk. W; Beedon Wood, &c. Common in both districts.

Carduus nutans L. and *C. crispus* L. Common.

Cnicus acaulis Hoffm. Common. W: Beedon, &c.

Centaurea nigra L., b. *decipiens* (Thuill). M: Langley; Hampstead Norris. W: Beedon Common; Catmore; Ilsley Downs. Extreme dwarf form, as on Salisbury Plain. I did not see a plant that I should call typical *nigra*. — *C. Scabiosa* L. Unusually common.

Cichorium Intybus L. Rather common, especially at Hampstead Norris (M) and Peasemore (W).

Hieracium umbellatum L. M: Fence Wood; Hermitage. — *H. boreale* Fr. M: With last, and on Cold Ash Common. W: Snelsmore Common,

Tragopogon pratensis L. M: Beedon; East Ilsley.

Campanula glomerata L. W: Beedon; Catmore; Ilsley Downs (M and W). Locally common. — *C. Trachelium* L. M: Langley Wood; Sandy Lane. W: Beedon Wood; Catmore.

Specularia hybrida DC. W: Corn-field, Beedon.

Vaccinium Myrtillus L. M: Fence Wood and Cold Ash Common.

Lysimachia Nummularia L. Locally common. M: Fair Cross Pond. W: Beedon Wood.

Vinca minor L. M: Langley. Denizen.

Lycopsis arvensis L. M: Sandy Lane. W: Beedon and World's End.

Myosotis palustris With. M: Hampstead Norris. No other "water Forget-me-not" seen.

Cuscuta Epithymum Murr. M: Cold Ash Common.

Atropa Belladonna L. M: Westbrook Copse; abundant, and apparently as truly native as the *Solanum Dulcamara* and *Inula Conyza* that grew with it.

Verbascum Thapsus L. Common. — *V. nigrum* L. M: Hampstead Norris, in one spot.

Linaria viscida Mœnch. M: Langley, corn-field.

Mimulus luteus L. A well-established alien in the stream at Hampstead Norris (M).

Veronica polita Fr. M: Beedon, &c. Much commoner than *agrestis*, which I found with difficulty. — *V. scutellata* L. M: Fair Cross Pond. — *V. Anagallis* L. M: Hampstead Norris, stream. W: Winterbourne.

Bartsia serotina Reichb. W: Catmore.

Pedicularis palustris L. M: Fence Wood.

Melampyrum pratense L. M: Sandy Lane; Hermitage. W: In plenty in Beedon Wood, and in wood near Snelsmore Common.

Verbena officinalis L. Locally common. M: Hampstead Norris, and near World's End. W: Chieveley.

Origanum vulgare L. Abundant in Hampstead Norris (M), and between Beedon and East Ilsley (W).

Thymus Serpyllum Fr. Frequent. — *T. Chamædrys* Fr. M: Hermitage and Cold Ash Common.

Calamintha Clinopodium Benth. Very common. W: Beedon Wood, &c. — *C. arvensis* Lam. M: Westbrook. W: Between Beedon and East Ilsley.

Nepeta Cataria L. M and W: Along the Newbury and Abingdon Road; rather frequent, especially near Chieveley.

Lamium album L. and *Ballota nigra* L. Especially common.

Scleranthus annuus L. M: Westbrook.

Chenopodium polyspermum L. M: In potato field and waste ground around, by cottage in Fence Wood; in great quantity.—*C. Bonus-Henricus* L. Exceptionally common in and near all the villages and hamlets.

Fagopyrum esculentum Mœnch. W: Beedon, garden weed.

Rumex acutus L. W: Beedon; Winterbourne.

Daphne Laureola L. M: Westbrook Copse.

Thesium linophyllum L. W: Ilsley Downs.

Betula alba L. and *B. pubescens* (Wallr.). M: Fence Wood.

Populus tremula L. M: Hermitage; Westbrook.

Polygonatum multiflorum All. M: Langley Wood; Sandy Lane, bushy banks; Westbrook. W: Beedon Wood. A characteristic woodland plant of this part of Berks.

Juncus glaucus Ehrh. Seen only at Catmore (W).

Luzula pilosa Willd. M: Westbrook.

Sparganium simplex Huds. M: Fair Cross Pond.

Carex muricata L. M: Westbrook; Hampstead Norris.—*C. divulsa* Good. Frequent. M: Langley; Hampstead Norris. W: Beedon.—*C. pilulifera* L., *C. binervis* Sm., and *C. minor* Towns. M: Cold Ash Common.

Alopecurus agrestris L. W: Beedon, frequent. — *A. geniculatus* L. M: Fence Wood. — *A. pratensis* L. W: Border of copse, Peasemore.

Milium effusum L. W: With the last.

Agrostis canina L. M: Fence Wood. W: Snelsmore Common.

Deschampsia flexuosa Trin. M: Fence Wood and Cold Ash Common; Hermitage. W: Copse, Peasemore.

Avena pratensis L. W: Catmore; Ilsley Downs (M and W).

Melica uniflora Retz. Locally common. M: Langley Wood, &c. W: Catmore, &c.

Poa nemoralis L. M: Westbrook. W: Copse, Peasemore.

Glyceria pedicillata (Towns.). M: Hampstead Norris.

Brachypodium pinnatum Beauv. W: Catmore; Ilsley Downs (M and W).

Equisetum maximum Lam. W: Wood near Snelsmore Common.

I can also give localities for the following "common" plants, desiderata in their respective districts in Mr. Britten's lists:—

In District M:—*Ranunculus Ficaria*, *Cardamine flexuosa*, *Brassica Sinapis* and *alba*, *Senebiera Coronopus*, *Polygala serpyllacea*, *Lychnis alba*, *Stellaria media* and *uliginosa*, *Geranium Robertianum*, *Trifolium pratense* and *hybridum*, *Lotus pilosus*, *Gnaphalium uliginosum*, *Achillea Millefolium*, *Matricaria inodora*, *Senecio sylvaticus* and *Jacobæa*, *Cnicus arvensis*, *Crepis virens*, *Hypochæris radicata*, *Leontodon hirtus*, *hispidus* and *autumnalis*, *Sonchus asper* and *arvensis*, *Calluna Erica*, *Erica Tetralix* and *cinerea*, *Fraxinus excelsior*, *Scrophularia nodosa*, *Veronica Chamædrys* and *Beccabunga*, *Mentha hirsuta*, *Teucrium Scorodonia*, *Chenopodium album*, *Atriplex angustifolia*, *Polygonum*

Convolvulus, *aviculare*, *Hydropiper* and *Persicaria*, *Rumex conglomeratus* and *Acetosella*, *Euphorbia Peplus* and *exigua*, *Ulmus montana*, *Quercus pedunculata*, *Salix cinerea*, *aurita*, *Caprea* and *repens*, *Juncus squarrosus*, *effusus*, *conglomeratus*, *supinus*, *lamprocarpus* and *acutiflorus*, *Lemna minor*, *Potamogeton natans*, *Eleocharis palustris*, *Carex echinata* and *glauca*, *Anthoxanthum odoratum*, *Agrostis alba* and *vulgaris*, *Aira præcox*, *Deschampsia cæspitosa*, *Sieglingia decumbens*, *Molinia cærulea*, *Poa annua*, *Festuca sciuroides*, *Bromus giganteus*, *Lolium perenne*, *Agropyron repens*, *Nardus stricta*, *Lomaria Spicant*, *Lastræa dilatata*, *Athyrium Filix-fœmina*, *Equisetum arvense*.

In District W :—*Ranunculus Flammula*, *Helianthemum Chamæcistus*, *Cerastium triviale*, *Sagina procumbens*, *Spergula arvensis*, *Hypericum pulchrum*, *Linum catharticum*, *Medicago lupulina*, *Trifolium dubium*, *Lotus pilosus*, *Filago germanica*, *Artemisia vulgaris*, *Lapsana communis*, *Linaria Cymbalaria*, *Veronica persica*, *Rumex conglomeratus* and *Acetosella*, *Luzula multiflora*, *Trisetum flavescens*, ***Sieglingia decumbens***, ***Bromus asper***.

A SYNOPSIS OF *TILLANDSIEÆ*.

By J. G. Baker, F.R.S., F.L.S.

(Continued from p. 306).

102. Tillandsia loliacea Mart.; Roem. et Schultes, Syst. vii. 1204.—Leaves densely rosulate, short, linear-subulate from a dilated base, densely clothed with ovate-lanceolate spreading argenteous scales. Peduncle 3–4 in. long. Flowers 4–7 in a simple lax spike with a flexuose rachis, ascending; flower-bracts ovate, lepidote, $\frac{1}{6}$–$\frac{1}{4}$ in. long. Calyx naked, $\frac{1}{4}$ in. long; segments ovate-oblong, obtuse. Capsule cylindrical, under an inch long.

Hab. Brazil; Province of Bahia, on rocks, *Martius*.

103. T. Karwinskiana Roem. et Schultes, Syst. vii. 1209; Baker in Gard. Chron. 1878, ii. 460. — Leaves 20–30 in a dense rosette; ovate base $1\frac{1}{2}$ in. diam.; blade lanceolate-subulate, a foot long, an inch broad at the base, moderately firm in texture, nearly or quite naked on the face, thinly lepidote on the back. Peduncle $\frac{1}{2}$ ft. long; lower bract-leaves with long free points. Inflorescence a lax simple spike 3–4 in. long; flowers 8–12, adpressed to the rachis; flower-bracts oblong-lanceolate, naked, $\frac{3}{4}$-1 in. long. Calyx $\frac{1}{2}$ in. long. Petal-blade oblanceolate, violet, as long as the calyx. Stamens and style longer than the petals.

Hab. Mexico, *Karwinsky*. Described from a living plant, sent by Mr. C. S. Sargent, that flowered at Kew in Dec., 1877.

104. T. narthecioides Presl, Rel. Haenk. ii. 125; Roem. et Schultes, Syst. Veg. vii. 1204. — Leaves 20–30 in a dense rosette, lanceolate-setaceous, 1–2 ft. long, $\frac{1}{3}$ in. broad above the dilated base, tapering gradually into a long point, rigidly coriaceous, obscurely lepidote on the back. Peduncle slender, $\frac{1}{2}$ ft. long; bract-leaves small, imbricated, entirely adpressed. Inflorescence

a lax simple spike 6–9 in. long; flowers erecto-patent or subpatent, ½ in. apart; flower-bracts oblong, naked, ½ in. long, wrapped tightly round the calyx. Calyx reaching nearly the tip of the bract. Petal-limb whitish, ¼ in. long. Capsule cylindrical, 1–1¼ in. long.

Hab. Guayaquil, *Haenke*, *Jameson* 376! Described from a plant flowered by Mr. Wm. Bull, Dec., 1877.

105. **T. oligantha,** n. sp.—Leaves lanceolate-acuminate, nearly a foot long; dilated base 1½ in. broad; blade rigidly coriaceous, densely finely lepidote on both surfaces, ½ in. broad at the middle, tapering gradually to a short convolute apex. Peduncle erect, nearly twice as long as the leaves; lower bract-leaves with setaceous free points; upper small, entirely adpressed. Inflorescence a lax simple 4–5-flowered spike 3–4 in. long, with a very flexuose rachis; flowers ascending; flower-bracts ovate-oblong, ¾ in. long. Calyx ½ in. longer than the bract; sepals obtuse. Corolla not seen.

Hab. South Brazil, *Glaziou* 15472! Allied to *T. ventricosa* Wawra.

106. T. FILIFOLIA Cham. et Schlecht. in Linnæa, vi. 53. *Platystachys filifolia* Beer, Brom. 264. *T. staticiflora* E. Morren in Belg. Hort. 1871, 177, t. 12. — Leaves very numerous, filiform from an ovate base ¼ in. long, ⅙ in. broad; blade 4–6 in. long, ⅓ lin. diam. at the middle, obscurely lepidote. Peduncle very slender, shorter than the leaves. Panicle 4–6 in. long; spikes 4–8, ascending, very lax, 2–3 in. long; rachis slender, naked, rather flexuose; flowers distant, erecto-patent; flower-bracts oblong-lanceolate, glabrous, ⅓ in. long. Calyx just protruding beyond the bract. Petal-blade ovate, acute, ⅙ in. long, pale violet. Stamens not protruded beyond the petals. Capsule twice as long as the calyx.

Hab. Mexico; Hacienda de la Laguna, *Schiede et Deppe* 1005! Yucatan and Tabasco, *E. P. Johnson*! Cordova, *Bourgeau* 2102! Orizaba, *Bourgeau* 1202! *Broteri* 1052! Vera Cruz, *Linden*! A very distinct species.

107. **T. Jenmani,** n. sp.—Leaves few in a rosette, with a large ovate-utriculate base 2 in. long, 1½ in. broad, and a lanceolate-subulate blade 3 in. long, ¼ in. broad at the base, rigidly coriaceous, finely lepidote. Peduncle slender, curved, under a foot long; bract-leaves small, lanceolate, adpressed. Panicle very lax, deltoid, ½ ft. long; branches about 5, lateral patent, 8–10-flowered; flowers lax, patent; flower-bracts shorter than the calyx. Sepals oblong, ⅙ in. long. Petals not seen. Capsule-valves linear, an inch long.

Hab. Demerara; Kaieteur Savanna, *Jenman* 848! Allied to *T. parviflora* R. & P.

108. T. LIMBATA Schlecht. in Linnæa, xviii. 419. — Leaves lanceolate-setaceous from a dilated ovate base 1½–2 in. broad, 1½–2 ft. long, lepidote on both surfaces, especially beneath. Inflorescence with panicle 3 ft. long; spikes lax, with a flexuose rachis; flower-bracts ovate, violet-tinted, ¾ in. long. Calyx longer than the bract; sepals obtuse. Corolla unknown. Capsule longer than the calyx.

Hab. Mexico; Hacienda de la Laguna, *Schiede*.

109. T. FLEXUOSA Swartz, Prodr. 57; Fl. Ind. Occ. ii. 590; Roem. et Schultes, Syst. vii. 1213; Lindl. Bot. Reg. t. 749; Schlecht. in Linnæa, xviii. 417; Griseb. Flora Brit. West Ind. 595. *T. tenuifolia* Jacq. Amer. 92, t. 63; Pict. t. 93. *T. aloifolia* Hook. Exot. Flora, t. 205; Roem. et Schultes, Syst. Veg. vii. 1214; Miquel in Linnæa, xvii. 66; xviii. 375. *Vriesea aloæfolia* and *tenuifolia* Beer, Brom. 96. *Platystachys Ehrenbergii* K. Koch, Ind. Sem. Hort. Berol. 1873, App. 4, p. 5.—Leaves 10–20 in a dense rosette, with a large ovate utricular base 2–3 in. broad; blade 1–2 in. broad at base, 1–2 ft. long, tapering above the middle into a long convolute point, rigidly coriaceous, green or red-brown, hardly at all lepidote. Peduncle ½–1 ft. long; bract-leaves small, scariose, adpressed. Spikes very lax, few-flowered, 6–12 in. long, rarely simple, usually panicled; rachis flexuose; flowers erecto-patent; flower-bracts oblong, ¾–1 in. long. Calyx ¼–½ in. longer than the bract. Petals greenish white or tinged with claret-red, ½ in. longer than the calyx; blade lingulate. Stamens longer than the petals.

Hab. Mexico, *Ehrenberg*. Yucatan, *Schott* 288! Honduras, *Gabb*! Panama, *Hayes*! Cuba, *Wright* 3271! Jamaica, *Swartz*, *Purdie*! St. Vincent, *Guilding*! St. Thomas, *Baron Eggers* 397! Trinidad, *Baron Schach*! *Fendler* 826! Santa Martha, *Purdie*! Carthagena, *Jacquin*. Venezuela, *Fendler* 1526! 2451! Demerara, *Schomburgk*! *Jenman* 3827! Surinam, *Kegel* 436, 1048.

110. T. VENTRICOSA Wawra in Oester. Bot. Zeitsch. xxx. 222; French transl. 71; Itin. Prin. Sax. Cob. 171.—Leaves densely rosulate; base ovate, 1½ in. broad; blade linear-setaceous, ½–1 ft. long, ¼–⅓ in. broad at the middle, densely lepidote. Peduncle 8–16 in. long; lower bract-leaves leaf-like; upper small, adpressed. Inflorescence a lax panicle, with 2–4 spreading 6–8-flowered branches 2–3 in. long; flowers lax, patent; bracts oblong-lanceolate, reddish brown, above an inch long. Calyx rather shorter than the bract; sepals obtuse. Corolla not seen. Capsule 1½ in. long.

Hab. South Brazil; Corocovado Mountains, *Wawra & Maly* ii. 224; *Glaziou* 11583! Allied to *T. flexuosa*.

111. **T. brevibracteata**, n. sp. — Leaves 20–30 in a rosette; dilated base ovate, 2 in. broad; blade above a foot long, an inch broad at the base, rigidly coriaceous, densely finely lepidote on both surfaces, tapering gradually into a setaceous point. Peduncle a foot long, stiffly erect; bract-leaves with long free points. Panicle above a foot long; branches numerous, ascending, peduncled, lower 6–8 in. long, 10–12-flowered; flowers laxly disposed, erect, adpressed to the flexuose rachis; flower-bracts ovate-oblong, obtuse, ⅓ in. long. Corolla glabrous, twice as long as the bract; sepals obtuse. Corolla not seen. Capsule-valves lanceolate, 1½ in. long, ¼ in. broad.

Hab. Forests of Martinique, *Hahn* 524! 578! 680! Received from Dr. Cosson and the Paris Museum.

112. **T. erectiflora**, n. sp. — Leaves densely rosulate; dilated base suborbicular, 2 in. long and broad; blade lanceolate, acute,

½ ft. long, ½ in. broad at the middle, flexible, thinly finely lepidote. Peduncle shorter than the leaves; bract-leaves small. Inflorescence a lax panicle a foot long, with several slender ascending branches; flowers 4–6 to a spike, adpressed to the rachis, the tip of the calyx of one just reaching the base of the next; flower-bract oblong-lanceolate, acute, glabrous, an inch long. ¼ in. broad. Calyx reaching to the tip of the bract. Corolla and capsule not seen.

Hab. South Brazil, *Boog*! (Herb. Hooker). Allied to *T. flexuosa*.

(To be continued.)

ON A NEW SPECIES OF *BOEA* FROM NEW GUINEA.

By H. O. Forbes, A.L.S., F.R.G.S.

On page 14 of the fourth part of his 'Descriptive Notes on Papuan Plants,' Baron von Mueller identifies a species of *Boea* which prettily picks out in deep blue the abrupt cliffs of the Astrolabe Range, as *B. Treubii*, a species described by me from the calcareous rocks of Karang-nata, in West Sumatra. I have drawn the attention of Baron von Mueller to the differences between the two, and he writes me that the Papuan and Sumatran forms have been united into one species by Mr. C. B. Clarke, whose observations I have not seen, as I have very few botanical works by me here. To me, who have seen both plants in their natural habitat, there cannot be a moment's hesitation in assigning them to markedly different species. For the Astrolabe specimen I propose the name *B. Lawesii*, after its first gatherer, the well-known head of the London Missionary Society at Port Moresby. The habit of the two forms is quite distinct; the Sumatran is tall, tending to become shrubby; the Papuan is low and procumbent. In foliage there is a wide difference, but the most marked divergences appear in the inflorescence, whose bracts in the Sumatran form are very characteristic. The Papuan *B. Lawesii* is closely related to the Celebesian *B. Minahassæ* Teys. (Journ. Linn. Soc. xix. 297), if I recall that form vividly enough.

[We forwarded Mr. Forbes' note to Mr. C. B. Clarke, who has since inspected the specimens, and writes as follows :—

"I am obliged by your sending me the note of Mr. H. O. Forbes establishing his *Boea Lawesii*, and also showing me his fine dried specimens in the British Museum. Mr. Forbes is quite right in thinking it entirely different from his *B. Treubii*. I cannot say whether the New Guinea plant sent by Lawes, quoted by me in DC. Monogr. v. 3, p. 142, was *B. Lawesii* of Forbes or not, for unfortunately the specimen cited is temporarily mislaid. However this may be, *B. Lawesii* is a new and very distinct species, differing specially from the other Boeas in its corolloid coloured glabrous calyx. Several of the Didymocarpi have a corolloid calyx of this kind (*D. pulchra*, *D. subalternans*). I add a short description of the new species, which is easily distinguished :—

"**Boea Lawesii** (H. O. Forbes in Herb. Mus. Brit. !). Caulis 3–4 dm. longus, lignosus, a ramulis 1–2 dm. longis superatus. Folia 4–8 cm. longa, longe petiolata, elliptica, utrinque (subtus sericeo-) villosa. Corymbus admodum compositus, pulchre multiflorus; bracteæ 1–2 cm. longæ, oblongæ, foliiformes; pedicelli 1 cm. longi. Calyx ovoideo-campanulatus, semi-5–fidus, corolloïdeus, glaber, pallide purpureo-roseus; segmenta ovata. Corolla læte violaceo-cærulea. Capsula 2 cm. longa, linearis, admodum torta.

"New Guinea; in regione Sogeri, alt. 1100 metr., H. O. Forbes, n. 850."]

SHORT NOTES.

Carex Bœnninghauseniana in Wexford.—This rare sedge, of which my friend Mr. More tells me there is only one known Irish locality, grows in fair abundance within the demesne of Kilmanock on boggy ground, both in woods and on open ground, reclaimed bog, as I believe. I am glad to be able to contribute this second Irish locality towards the second edition of 'Cybele Hibernica,' which I hear is rapidly progressing.—G. E. H. Barrett-Hamilton.

Clinopodium vulgare in Wexford.—I gathered a few specimens of this rare Irish plant on the roadside near Arthurstown, close to the Hook, where it grows sparingly, and has been observed for some years.—Gerald E. H. Barrett-Hamilton.

Limnanthemum peltatum Gmel. in Northants (p. 315).—The *Limnanthemum* was planted in the reservoir about twenty years ago; the record therefore gives no extension of the area marked out in the 'Student's Flora.' The reservoir itself is, I suppose, of comparatively recent date, being probably coeval with the Grand Junction Canal. The occurrence of *Limnanthemum* in ponds in the Midlands is generally suspicious.—G. Claridge Druce.

Note on Botanical Nomenclature. — Mr. Jackson (p. 312), referring to *Mentha piperita*, quotes me for the statement that the authority for this is Linnæus, not Hudson. The Linnean plant called *piperita* in 1st edit. Spec. Plant. is, *fide* Withering and Smith, a form of *hirsuta*. In face of this may not the generally accepted name of Hudson be allowed to stand? In that case then also *Veronica Tournefortii* Gmel. must replace *V. persica* Poir. I wish Mr. Daydon Jackson would kindly give us an authoritative rule for quoting varietal names, since a very large proportion of those in Lond. Cat. are either illogical or erroneous. Personally I like the plan of quoting the original name and its author's, enclosing the latter in brackets should he have described it as a species or under a different generic or specific name. Since the quotation, for instance, of *Salix purpurea* L. var. *Lambertiana* (Smith) is more distinctive than *S. purpurea* L. var. *Lambertiana* Lindl., because we all know of Smith's description, whereas Lindley's connection with the variety is of the slightest. If, however, it be considered

necessary to quote the first author who referred the variety to its proper specific and generic name, I do hope in future editions of the 'London Catalogue' the original describer's name will be quoted in brackets afterwards, as, although more printing will be necessary, the present *space* will amply suffice. With respect to the rule for using Linnean and other names in a restricted sense, I think writers on topographical Botany would be less likely to blame the use of properly applied segregate names, while they certainly would be less likely to lead to confusion; but at any rate, is the above rule carried out in the Lond. Cat.? Why write *Sparganium ramosum* Curtis, why *S. affine* Schniz? Why not restore *Juncus inflexus*, *Ranunculus aquatilis*, *Myosotis scorpioides*, *Hieracium alpinum*, *Potamogeton compressus*, *gramineus*, &c. — G. Claridge Druce.

Rubus Leesii in Scotland. — This was recorded as a Scottish plant (from Fifeshire) by Dr. Mactier in Gard. Chron. for Nov. 25, 1882, and 'Scottish Naturalist' for Oct. 1883, p. 90. A small thicket of it also occurs near Perth, and has been known for many years.—F. Buchanan White.

Impatiens biflora Walt. (*I. fulva* Nutt.).—In spite of Mr. Jackson's and Mr. Druce's researches, we have not yet settled the names of the plants in the 'London Catalogue.' That work, as well as all British Floras and such books as Sereno Watson's invaluable 'Index to N. American Botany,' gives *Impatiens fulva* as the name of our naturalised Balsam. But Nuttall deliberately set aside Walter's much earlier name, *I. biflora*, as well as *I. maculata* Muhl., which also preceded his, saying:—"As several species are spotted, I have not adopted the last name, and changed the former because it was deceptive" (Gen. N. Amer. Plants, i. 146). Nuttall's name dates from 1818, Walter's (Fl. Carolin. 219) from 1788: the latter was retained by Sweet in Brit. Flower Garden, t. 43 (1824), but seems to have entirely dropped out of use.—James Britten.

NOTICES OF BOOKS.

The Flora of Cardiff: a descriptive list of the Indigenous Plants found in the District of the Cardiff Naturalists' Society. By John Storrie, Curator, Cardiff Museum. Published by the Cardiff Naturalists' Society. 1886. 8vo, pp. v, 129. Price 4s.

Any book which helps to complete our knowledge of the plants of the Principality cannot fail to find a welcome among British botanists. It is remarkable that we have no flora for any one of the Welsh counties which approaches in completeness such books as the Floras of Oxfordshire, Hampshire, and Plymouth, among later works, or those of Cambridgeshire, Essex, or Middlesex of an earlier date. Davies' 'Flora of Anglesea,' published in 1813, is in some sense a classic, and remains the most ambitious attempt

at a Welsh flora that has yet appeared. This is in no sense a disparagement of Mr. J. E. Griffith's 'Flora of Carnarvonshire and Anglesea,' which is a useful list, but in no way corresponds with what we now consider a local flora should be. Great advances have, it is true, been made since Mr. Watson, in 1873, gave a list of "nine counties for which no lists of the commoner plants have been obtained,"* four out of the nine being Welsh: the Reports of the Botanical Record Club and our own pages have contained many contributions to the knowledge of these counties; but we still need anything like a complete and satisfactory Flora for any Welsh county.

Mr. Storrie's book differs in some respects from most of its predecessors in being descriptive, and it is thus a botanical manual for the district of which it treats—the eastern half of Glamorganshire, comprising an area of 530 square miles. The author lays no claim to originality in the descriptive portion: "it is," he says, "simply a compilation, in which I have endeavoured to use whatever may tend to forward" the determination of the species. So far as a cursory examination enables us to judge, he has done his work very well; although, as the utmost possible compression was his object, we could have dispensed with the constantly recurring "herb," if the exceptions to this had been noted.

As compared with such Floras as we have named, Mr. Storrie's book must be considered meagre. There is no attempt to divide the large area into districts; nor do we find anything about the drainage, climatology, geology, or other forces which regulate and limit the flora of a district. The bibliography is neither exhaustively nor satisfactorily treated; indeed, coming as it does immediately after the preface and so at the beginning of the book, it is calculated to prejudice the reader unfavourably. It abounds in misprints (and it must be confessed that these are sadly numerous all through the book), and its citations are neither complete nor well arranged.

The main portion of the work, however, consists of the descriptive lists; and many items of general interest may be gleaned from it. It is interesting, for instance, to know that the Peony still abounds on the Steep Holme island; "attention being specially called to the plant during a meeting of the British Association at Bristol in 1860, it was carried off wholesale by excursionists, &c., until only four or five plants remained on inaccessible parts of the cliff; but strict supervision on the part of the proprietor of the island, who prohibits the removal of roots, has enabled the plant to regain nearly its former luxuriance." This being so, we do not quite understand why Mr. Storrie places this among "extinctions." *Polypodium cambricum* is less fortunate; it remained in the station given by Ray until about ten years since, when an itinerant fern dealer "uprooted every plant, and

* The number should probably be increased by another Welsh county, for the informant on whom Mr. Watson relied for his Flint material was notoriously untrustworthy.

sold hundreds of them at 1s. each. I bought one of them myself," adds Mr. Storrie, who must therefore, we fear, be regarded as *particeps criminis*. The prickly subjects included under *Rubus* and *Rosa* meet with little consideration; and other genera are treated in a way which will not satisfy the critical botanist.

There is a long and interesting list of foreign plants found on the ballast-heaps near Cardiff and Penarth Docks; among these *Scolymus hispanicus* has maintained its ground since 1873, while many annuals appear every year. A good many of the plants classed as indigenous should be relegated to this appendix; such as the two species of *Amaranthus*, *Lythrum Hyssopifolia*, two Melilots, *Linum usitatissimum*, *Arthrolobium ebracteatum*, *Vicia lutea*, *Linaria supina*, *Mimulus luteus* ("spreading a good deal during the last ten years"), and the like.

A large number of Welsh names are given, but it is clear even to those who know no Welsh that they have no more claim to the title than the spurious names found in our Floras have to be considered English. They are carefully indexed, which, oddly enough, the English names are not; and among them are some genuine ones, of which the Saxon reader would have welcomed a translation.

The book is well printed, but the arrangement of types is far from judicious. No authorities are appended to the names of either genera or species. Attention to the points indicated will enable Mr. Storrie to make great improvements in a second edition, which we hope will be called for before very long. J. B.

New Books.—H. Schmidt, 'Flora von Elberfeld und Umgebung' (Elberfeld, Lucas: 8vo, pp. 287). — P. Kunth, 'Flora der Provinz Schleswig-Holstein' (Leipzig, Leuz: 8vo, pp. xii. 902, xxv.)— J. E. Planchon, 'Ampelideæ' (DC. Mon. Phan. v. pt. 2: Paris, Masson: 8vo, pp. 305–654).—J. Meister, 'Flora von Schaffhausen' (Schaffhausen, Schoch: 8vo, pp. vii. 202, viii.).—C. Salomon, 'Die Palmen' (Berlin, Parey: 8vo, pp. 184: 22 cuts). — H. Solms-Laubach, 'Einleitung in die Paläophytologie' (Leipzig, Felix: 8vo, pp. viii. 416: 49 cuts). — O. Penzig, 'Studi Botanici sugli agrumi e sulle piante affini' (Rome, Botta: text, 8vo, pp. vi. 590: atlas, 4to, tt. 58).—H. C. Hart, 'Flora of Howth' (Dublin, Hodges: 8vo, pp. 137, map).

Articles in Journals.

Bot. Centralblatt (No. 40). — J. M. Janse, 'Plasmolytische Versuche an Algen.' — (Nos. 41–43). P. Dietel, 'Beitrage zur Morphologie und Biologie der Uredineen.'

Botanical Gazette (Sept.).—W. G. Farlow, '*Æcidium* on *Juniperus virginiana*' (*Æ. Bermudiana*, n. sp.). — C. Robertson, 'Insect relations of certain Asclepiads' (1 plate). — E. L. Knowles, 'The "Curl" of Peach-leaves' (*Exoascus deformans*: 1 plate). — H. Thomson, 'An excursion to the Platte.'—J. Schneck, 'Dispersion of seeds of *Euphorbia marginata*.'

Bot. Zeitung (Sep. 30). — L. Jost, 'Beitrag zur Kenntniss der Athmungsorgane der Pflanzen.'— (Oct. 7). G. Karsten, 'Beiträge zur Kenntniss von *Fegatella conica*' (1 plate). — (Oct. 14). A. Tomaschek, 'Ueber *Bacillus muralis*.' — (Oct. 14, 21). J. Boehm, 'Ueber die Respiration der Kartoffel.'

Gardeners' Chronicle (Oct. 1). — W. G. Smith, '*Cladosporium lycopersici* (fig. 89). — (Oct. 8). W. B. Hemsley, 'The Botanical Magazine' (contd.).

Journal de Botanique (Oct. 1, 15). — A. Franchet, 'Le genre *Cyananthus*.'—E. Bonnet, 'Florule des îles Saint-Pierre et Miquelon.' — (Oct. 1). N. Patouillard, 'Note sur quelques champignons extra-européens' (*Xylaria striata*, *Melampsora Scleriæ*, spp. nn.).— (Oct. 15). H. Leconte, 'Effets produits par la décortication annulaire des arbres.'—G. Winter, *Amphisphæria terricola*, *Physalospora cupularis*, spp. nn.

Journ. Linn. Soc. (Botany: vol. xxiii., No. 152).—F. B. Forbes & W. B. Hemsley, 'Enumeration of Chinese Plants,' part iii. (Leguminosæ—Rosaceæ; (*Clitoria Hanceana*, *Mucuna sempervirens*, *Rhynchosia? Henryi*, *Euchresta tenuifolia*, *Mezoneurum sinense*, *Pterolobium punctatum*, *Gleditschsia australis* (t. 5), *Prunus hirtipes*, *Spiræa Henryi* (t. 6), *Rubus Kuntzeanus*, *R. Playfairii*, *Fragaria filipendula*, spp. nn., all of Hemsley; *Rubus Henryi* and *R. ichangensis* Hemsl. & O. Kuntze, spp. nn.).

Journ. Royal Microscopical Soc. (Oct.).—G. Massee, 'Monograph of *Lycoperdæ*' (129 species; *L. violascens*, *L. natalense*, *L. Colensoi*, *L. capense*, all of Cooke & Massee; *L. elatum*, *L. Cookei* Mass.; spp. nn.: 2 plates).

Nuovo Giornale Bot. Ital. (Oct.). — A. Bottini, 'Muscinee dell' isola del Giglio.'—P. Porta, 'Stirpium in ins. Balearium anno 1885 collectarum enumeratio' (*Sisymbrium balearicum*, *Lavatera Rigoi*, *Anthyllis fulgurans*, *Polycarpon Colomense*, *Ligusticum Huteri*, *Cirsium Willkommianum*, *C. balearicum*, *Seriola cæspitosa*, *Cichorium balearicum*, *Erythræa divaricata*, *Echium balearicum*, *Celsia floccosa*, *Linaria Rodriguezii*, *Juncus glandulosus*, *Carex rorulenta*, *Cynosurus pygmæus*, *Bromus demissus*, *Poa balearica*, spp. nn.).

Oesterr. Bot. Zeitschrift. (Oct.). — L. Celakovsky, 'Ueber einige neue orientalische Pflanzenarten (*Cerastium adenotrichum*, sp. n.).— V. v. Borbás, 'Zur Teratologie der Wallnuss.' — G. Schneider, 'Mittheilungen über die Hieracien des Riesengebirges.'

Pharmaceutical Journal (Oct. 15).—B. H. Paul & A. H. Cownley, '*Gleditschia triacanthos*.'—D. Hooper, '*Naregamia alata*, the Goanese Ipecacuanha.' — (Oct. 15, 22). C. Ford, Ho Kai, & W. E. Crow, 'Chinese Materia Medica.'

Scottish Naturalist (Oct.).—J. W. H. Trail, 'Report for 1887 on Fungi of East of Scotland.'—A. Bennett, '*Arabis alpina* and *Juncus tenuis* in Scotland.' — F. B. White, '*Juncus alpinus* as a British plant.'—W. H. Beeby, '*Carex cæspitosa* in Scotland.'

BOTANICAL NOMENCLATURE.

By Asa Gray, LL.D., F.R.S., &c.

In the October number of the 'Journal of Botany' I find that my fellow-countryman, Professor Edward Lee Greene, criticises and objects to the course which the Kew 'Index of Plant-names' is to follow, namely, that it "is to take the name under which any given plant is first placed in its true genus as the name to be kept up, even although the author of it may have ignored the proper rule of retaining the specific name when transferring it from its old genus to the new."

As this rule of adhering to the prior tenable name and of discountenancing superfluous names is charged with involving "bad logic" and "loose ethics," it may be well to call attention to the declaration of the most experienced and perhaps the most logical systematic botanist of our day upon this point of nomenclature, for he reprobates that which Mr. Greene recommends. In the 'Journal of the Linnean Society,' vol. xvii. p. 197, Mr. Bentham says:—

"There is one practice which has grown up of late years, adding largely to the number of useless synonyms, against which I cannot refrain from taking this opportunity of entering a strong protest. I mean that of creating a new name in order to combine an old specific with a new generic one, . . . and it is proposed to maintain for the specific appellation the right of priority, not in the genus alone in which it is placed, but in the whole of the genera to which, rightly or wrongly, it has been referred. . . . . When a botanist dismembers an old genus, rule 57 requires that he should strictly preserve the old specific names in his new genera, and when he has wantonly and knowingly neglected this rule it may be right to correct him. But when a botanist has established what he believes to be a new species, and has therefore given it a new name, the changing of this name after it has got into general circulation because it has been discovered that some other botanist had previously published it in a wrong genus, is only adding a synonym without any advantage whatever, and is not even restoring an old name, for the specific adjective is not of itself the name of a plant. . . . A generic name is sufficiently indicated by one substantive, for no two genera in the vegetable kingdom are allowed to have the same name: but for a species the combination of the substantive and adjective is absolutely necessary; the two-worded specific name is one and indivisible, and the combining of the substantive of one name with the adjective of another is not preserving either of them, but creates an absolutely new name, which ought not to stand unless the previous ones were vicious in themselves, or preoccupied, or referred to a wrong genus. It is probably from not perceiving the difference between making and changing a name that the practice objected to has been adopted by some of the first among recent botanists, such as Weddell, though under protest (see the note in DC. Prod. xvii. i. 73). To give a

couple of instances among hundreds that have lately presented themselves to me—Wight published a Nilgherry plant which he believed to be new, and which was certainly a new genus, under the name of *Chamæbaina cuspidata*, in all respects a legitimate name; and he could not be expected to identify it with *Urtica squamigera* of Wallich's Catalogue, as the plant is not an *Urtica*. Wight's name was therefore adopted in Weddell's excellent monograph, but in the 'Prodromus' he felt himself obliged, in spite of his better sense, to call it *Chamæbaina squamigera*, which is neither Wallich's faulty name nor Wight's correct one, but an entirely new name, to be rejected by the law of priority, which requires the adoption of the oldest correct name. So, again, an Indian grass was first named and described by Willdenow as *Coix arundinacea*, then named and described in the 'Hortus Benghalensis' and distributed by Roxburgh as *Coix barbata*, and entered in Sprengel's 'Systema,' with Willdenow's character, as *Coix Kœnigii*. All these names were defective as referring to a wrong genus. Brown corrected the error by creating the new genus *Chionachne*, and selected Roxburgh's specific name as the one most generally known and the least liable to misinterpretation; and Brown's *Chionachne barbata* is therefore the *first correct name;* for which Thwaites afterwards substituted *Chionachne Kœnigii*, an entirely new and useless name, which falls by the law of priority."

It is evident that the controlling tendency in botanical nomenclature of late years has been, and is, to insist more and more unqualifiedly upon the law of priority, and in this line to carry out the generally accepted code (formulated by Alphonse de Candolle) to its legitimate consequences. In conflicts of laws, this of priority of name tends to be paramount. That no new name should be made for the sake of bringing in an overlooked or reasonably neglected specific appellation strictly follows from the rule of priority and is altogether proper, as Mr. Bentham convincingly shows, and the prevalent practice of the systematic botanists who accept the (so-called) Candollean code at all is accordant with it. Probably it was because Mr. Bentham did not fall altogether into the current as respects the paramountness of priority that he allowed that when one had wantonly and knowingly neglected note 57, it *may* be right to correct him. But, as the above extract shows, Brown knowingly neglected the older appellation, *arundinacea*, and Bentham was far from correcting him. Operative as that rule should be, every practised systematist knows of numerous cases in which its application has with more or less propriety been limited. To enforce it nakedly by re-adjudication in ambiguous cases may be hardly better than doing so in cases where the older specific appellation was unknown; and to draw the line at "wantonness" may be difficult. To keep up the name under which any plant is first placed in its true genus is simple, thoroughly practicable, and in my opinion most conformable to accepted rules, as well as most conducive to the fixity of names. It is reasonable enough, under the stringent rule of priority, to resuscitate neglected older specific names pertaining to their proper genus; but surely it is unreason-

able and inconsiderate to conclude any such right to specific names out of the genus to which they are subordinate. So let us hope that the Kew 'Index of Plant-names' will proceed on the lines which have been indicated in the announcement of its plan, and will in general equally conform to the spirit of the code, which has been essentially accepted by most phanerogamous botanists of our day, as offering the largest hope of fixity and harmony.

THE FIGURES IN COOKE'S 'BRITISH DESMIDS.'

By Otto Nordstedt.

In his "Note on the Plates" of 'British Desmids' (p. 183), Mr. M. C. Cooke says that "The greater part of the figures have been drawn direct from the specimens themselves; in a few cases, where specimens were not available, copies have been made of published figures, as indicated in the plate description at the end of each species." Nevertheless, turning over the plates, one finds reminiscences of already-published figures on nearly all the plates, and one must therefore conclude that the British Desmids are very slightly variable, because Mr. Cooke's figures often are so completely identical with those one already knew. But, curiously, on several of these old acquaintances, figured by Mr. Cooke, one also meets with the same errors again, even when the description of the species is right. In such cases it is evident that the figures are copied, and not "drawn direct from the specimens themselves"; but in the plate-description commonly no author is quoted. Therefore I think it would be of some interest to give here an enumeration of certain species which seem to me to be copied after authors not quoted. I give these as examples only, as there are certainly more:—

After Ralfs, 'British Desmidieæ':—

Bambusina Brebissonii, fig. f.
Desmidium aptogonium, fig. f?
Docidium Baculum (partly?).
Closterium, several species, enlarged (often incorrect).
Penium margaritaceum, fig. a, b, g, h.
P. Cylindrus?
Tetmemorus Brebissonii and *granulatus* (probably copied, but carelessly; fig. 8c smooth).
Micrasterias oscitans, fig. c?
M. denticulata, fig. c.
M. radiosa, fig. b.
M. papillifera, fig. a, d, e.
M. Jenneri, fig. c.
Euastrum verrucosum, fig. c?
E. oblongum, fig. f; d and e.
E. crassum fig. c.
E. pinnatum fig. c, e.
E. affine fig. c, d.
E. ampullaceum fig. c.
E. cuneatum fig. a, b probably
E. ansatum fig. d, e (in b and c the punctuation).
E. sinuosum, fig. d, e.
E. pectinatum, fig. a, c, d, e.
E. gemmatum, fig. a, b, e, f, f.
E. elegans γ. spinosum, fig. c–e probably.
E. inerme (probably).
E. binale (partly, probably).
E. binale β. Ralfsii, fig, a, b.
Cosmarium sublobatum, fig. c.
C. Ralfsii, fig. c.
C. bioculatum, fig. a.

C. tinctum, fig. a, b, c, d.
C. Meneghinii (fig. a, b, c).
C. crenatum, fig. a (b, c).
C. undulatum, fig. a, b, e.
C. ovale, fig. b, c.
C. Botrytis, fig. g.
C. amoenum, fig. a–d.
C. coelatum, fig. f.
C. commissurale, fig. a–d.
C. cristatum, fig. a (?), d (?), e.
Calocylindrus cylindricus, fig. a, d.
C. cucurbita (mostly).
C. curtum, fig. c–e.
C. attenuatus, fig. c–e.
C. turgidus, fig. c (a and b partly ?)
Xanthidium armatum, fig. b, c, d, f.
X. antilopeum, fig. a.
Staurastrum dejectum, fig. a, c, g.
S. brevispina, fig. b infer.
S. cuspidatum, fig. e.
S. lunatum, fig. a, c.
S. furcatum var. *armigerum*, fig. a, c, d.
S. monticulosum, fig. a, d, e.
S. hirsutum, fig. f, g.
S. teliferum, fig. e.
S. asperum, fig. d, e.
S. orbiculare, fig. f, g.
S. muricatum, fig. b, d ?
S. pileolatum, fig. b, d.
S. tumidum, fig. a–d, pl. 57.
S. brachiatum, fig. a, a, b super., d, e partly.
S. tricorne, fig. a infer., pl. 58; fig. a, c, e, pl. 64.
S. cyrtocerum, fig. a, d.
S. polymorphum, fig. b infer., c, d, d, e.
S. gracile, fig. a super.
S. vestitum, partly.
S. læve, fig. a, b dextr.
S. controversum, fig. a, c, d, e ?
S. sexcostatum, mostly.
S. margaritaceum, mostly.
S. enorme [no Desmid].

After Archer (in several works):—

Gonatozygon Kinahani.
Mesotænium mirificum.
M. chlamydosporum.
Micrasterias Thomasiana (fig. d & f belong to *M. denticulata*, and fig. g to *M. rotata*, not to *M. Thomasiana*).
Calocylindrus tuberculatus, partly (tubercles incorrect).
Staurastrum O'Mearii.
S. cristatum, fig. c, d.
S. monticulosum, fig. c.
S. lanceolatum, fig. f, g.
[Mr. Cooke ought to have copied the figure of *Spirotænia tenerrima* Arch. in Proc. R. Irish Acad., Ser. 2, vol. ii., Science (1875), pl. 14.]

After Brébisson, List. Desm. Norm.:—

Calocylindrus palangula, fig. a, b.

After De Bary, Conjug.:—

Desmidium cylindricum, fig. b (d?).
Docidium minutum (*Pen. Ralfsii*). fig. 1 c.
Penium interruptum.
Cylindrocystis crassa, fig. b, c.
Mesotænium violascens, partly at least, but altered, from De Bary's fig.
Spirotænia bryophila, fig. a, b.
Cosmarium Portianum, fig. f. (*C. orbiculatum* De B.).

After Delponte, Spec. Desm.:—

Micrasterias crux-melitensis, fig. b, c.
M. apiculata, fig. c.
Euastrum verrucosum, fig. b.
Cosmarium pyramidatum, fig. a, b, c.
Xanthidium antilopeum, fig. b.
X. cristatum, fig. d, f.
Arthrodesmus convergens, fig. c, d, e.

After Focke, Phys. Stud. :—

Euastrum oblongum, fig. c.

After Hassall, Br. Freshwater Algæ :—

Euastrum circulare, fig. b. *Staurastrum gracile*, fig. a infer.

After J. B. Jacobsen, Aper. Desm. Den. :—

Cosmarium Jacobseni (Mr. Jacobsen did not give us any information of the dimensions of his form).

After W. Joshua, Journ. Bot. :—

Cosmarium Turpini var. *cambricum*.

After Lundell, Desm. Suec. :—

Penium didymocarpum, fig. b, c ? (incorrect).
Cylindrocystis diplospora, fig. a, b ? (incorrect).
Micrasterias rotata, fig. d.
Euastrum ventricosum, fig. b–d.
E. binale var. *elobatum*, fig. b, c.
E. erosum, fig. a–d.
Cosmarium anceps, fig. b, c, d.
C. variolatum, fig. b. c, d.
C. pachydermum, fig. b, c.
C. tetrachondrum, fig. b–d.
C. holmiense, fig. b–d.
C. tetragonum var. *Lundellii*, fig. a–d.
C. monomazum, fig. c, d.
C. quinarium, fig. b (c, partly).
C. quadrifarium, fig. b, c, d.
C. hexastichum, fig. b, c, d.
C. cyclicum, fig. c, d.
C. speciosum, fig. c, d (b ?).
Xanthidium aculeatum, pl. 43, fig. 10.
Staurastrum pterosporum, fig. f.
S. tumidum, fig. b.
S. bifidum, fig. b (d ?).
S. sexangulare, fig. b, d (a, c, e ?) (The spines on the processes not in accordance with the description ("margin delicately 3–4-toothed") or with Lundell's figures).
S. artiscon, fig. b.

After Nageli, Gatt. e. Alg. :—

Penium Nagelii, fig. a, a, b, c.
Calocylindrus annulatus, fig. a–f.
Staurastrum Griffithianum, fig. b–d.

After Nordstedt :—

Cosmarium homalodermum, fig. c. d
C. Schliephackianum var. *spettsbergensis*, fig. c (d), e, f.
C. ochthodes, fig. c, d.
C. sphalerostichum.
C. isthmochondrium (at least mostly).
C. subspeciosum.
C. oligacanthum.
Staurastrum inconspicuum.
S. Capitulum var. *amoenum*.
S. elongatum.

After Reinsch, Contrib. :—

Xanthidium cristatum, fig. g.

[It is a pity that *Cosmarium Reinschii* is *not* copied after Reinsch.]

After Richter :—

Docidium nobile; fig. c is not the end, but the basal part of a semicell.

After Wille :—

Cosmarium Boeckii, fig. b, c.

After Wittrock :—

Closterium calosporum, fig. c supr.
Cosmarium gotlandicum, fig. b.
C. calcareum, mostly.
Staurastrum læve var. *Clevei*.
S. pilosum, fig. b, e.
[The figures a, b, of *Cosmarium trafalgaricum* Wittr. are wrong]

ON EPIDERMAL CHLOROPHYLL.

By Spencer Le M. Moore. F.L.S.

We owe to Stöhr* the greater part of our knowledge about the chlorophyll of epidermal tissues. He found that of 102 dicotyledonous types as high a proportion as 94 had chlorophyll in the cells of their epidermis at some period of life. This result was quite unexpected in view of the prevalent idea of the exceptional occurrence of epidermal chlorophyll, an idea given fresh currency to by the then recently published volume of De Bary.†

Some observations made by myself during the past summer and autumn work out as follows :—Out of 120 angiospermous species 102 had chlorophyll in the epidermis of at least the leaf's underside; the number of dicotyledons was 115, of which 101 furnished epidermal chlorophyll. This is a somewhat lower proportion than that found by Stöhr, the percentage being 92·15 in the one case and 87·82 in the other, but it amply confirms Stöhr's statement. My list contained ordinary flower- and kitchen-garden herbs, besides a few wayside, &c., plants; and some shrubs and trees, such as lime, elm, holly, Spanish chestnut, *Mahonia aquifolia*, apple, pear, plum, and cherry; there was thus nothing peculiar about it, and one may safely conclude that of any hundred random-planted dicotyledonous species from 85 to 95 will have chlorophyll grains in at least some part of their epidermis.

Stöhr relied upon sections and upon bird's-eye views of the cells; the easier and surer method—in that the whole of the cell is visible at once from the best possible point of view—is to tear off small pieces of epidermis, and mount them immediately in water. In most cases considerable stretches of the tissue can thus be obtained without any difficulty; and careful focussing and a little practice in detecting the differences in respect of colour and size between the chlorophyll of epidermal and that of the underlying more or less broken-up palisade or mesophyll cells are all the points to be borne

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* Sitzb. der K. Akad. Wien. 1879, p. 87. † Vergl. Anat. p. 70.

in mind.* Speaking generally, the latter cells' chlorophyll is markedly deeper in shade than is that of the epidermis. In size the epidermal grains are almost always much smaller than those of the other cells; but they are usually about as large as the stomatal guard-cell grains, though considerably larger in *Solanum* (*tuberosum*, *nigrum*, *Dulcamara*); in *Petunia nyctaginiflora*; in some *Compositæ*, as *Arctium Lappa* and *Lactuca sativa*; and in *Polygala vulgaris*, *Melampyrum pratense*, *Urtica urens*, *Mercurialis annua*, *Bryonia dioica*, &c.

In the matter of the distribution to both upper and lower leaf-epidermis, I differ almost as widely from Stöhr as he does from old authors upon the general question. According to him, only 12 of the 102 types had chlorophyll in their upper and lower epidermis; as many as 26 out of 50 examined by me were in this condition, *viz.*:—

Nigella damascena.
Capsella Bursa-pastoris.
Viola odorata.
V. canina.
Reseda odorata.
Dianthus barbatus.
Stellaria media.
Pelargonium zonale.
Ribes nigrum.
R. rubrum.
Circæa lutetiana.
Cucurbita ovifera.
Bellis perennis.
Dahlia sp.
Senecio vulgaris.
Chrysanthemum Leucanthemum
Pyrethrum sinense.
Tagetes patula.
Centaurea Cyanus.
Campanula medium.
Rhododendron ponticum.
Petunia nyctaginiflora.
Solanum Dulcamara.
S. nigrum.
Mercurialis annua.
Urtica urens.

The remaining 24 had chlorophyll only in the lower epidermis:—

Sisymbrium officinale.
Arabis alpina.
Mahonia aquifolia.
Hibiscus africanus.
Oxalis Acetosella.
Tropæolum majus.
T. canariense.
Cratægus Oxyacantha.
Fragaria elatior.
Ribes Grossularia.
Godetia rubicunda.
Bryonia dioica.
Petroselinum sativum.
Lactuca sativa.
Chrysanthemum frutescens.
Anagallis arvensis.
Primula vulgaris.
Digitalis purpurea.
Borrago officinalis.
Lamium purpureum.
Mentha piperita.
Verbena chamædrifolia.
Spinacia oleracea.

Of the first list, *Nigella damascena*, *Viola odorata*, *Pelargonium zonale*, and *Ribes rubrum* are said by Stöhr to have chlorophyll on the under-side alone, but careful re-examination has confirmed my former opinion with respect to these. *Nigella damascena* is remarkable for having spaces of epidermis without chlorophyll alternating with chlorophylligerous ones.

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* In a few cases plasmolysis was practised; usually this is quite unnecessary.

One explanation of the discrepancy between us may perhaps be sought in the different time of year at which our respective observations were made. Stöhr has argued, though certainly from no very wide experience, that the reason for the rareness of upper as compared with lower epidermal chlorophyll resides in the injury done to the chlorophyll by strong sunlight. Probably no one would deny that the intensity of illumination is a factor of prime importance in the life of epidermal cells; but it does not follow therefrom that the injurious effects of too strong sunlight make themselves manifest upon chlorophyll alone: it would seem at least probable that the protoplasm bears the brunt of the attack, and, becoming weakened, that degeneration of chlorophyll ensues. But be this as it may, the facts which follow may be cited as showing that intense light denudes the epidermis of its chlorophyll. During the past summer I have had under my eye two groups of young *Campanula medium* plants, one set freely exposed to the sun, the other growing in the shade of trees so as to receive direct sunlight for but a very short time each day. It was found that healthy leaves of the shaded plants had chlorophyll well-developed in their upper as well as their lower epidermis; whereas chlorophyll, although equally well-developed in the lower epidermis of the other set,* was absent from most of the cells on the upper side. The chlorophyll-containing cells' protoplasm was in a healthy condition; that of the other cells took the form of a cloudy granular mass. Now, it was from April to July that Stöhr was occupied with his researches, that is a period of the year during which light is at its greatest intensity; and the portion of my work dealing with this branch of the subject was undertaken at the end of September, in a poor light, and after a long spell of dull weather.†

Not one of the four aërial monocotyledons examined by me (*Iris germanica*, *Lilium tigrinum*, *Poa annua*, and *Narthecium Ossifragum*) had epidermal chlorophyll; which was in no case present in the upper, without also showing itself in the lower epidermis. In both these respects I am in unison with Stöhr. I cannot, however, agree with him that etiolin is not formed in the epidermal cells, as *Campanula medium* and *Dianthus barbatus*, the only two types to which I appealed, both yielded etiolin: the small size and scattered position and the consequent paleness of these etiolin grains probably caused Stöhr to overlook them. Dividing grains were found in *Campanula medium*, *Chrysanthemum Matricaria*, and Borage.

It is also necessary to differ from Stöhr on the question of assimilation. He found starch in the epidermal grains of *Oxalis Acetosella* alone; all his other types, he says, gave negative results, and he seems disposed therefore to doubt whether the starch which he did see in *O. Acetosella* was the product of epidermal assimilation.

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* I have failed to find any support for Stöhr's antecedently improbable notion that chlorophyll may be formed in epidermal cells during the afternoon and succeeding early forenoon, and be destroyed when illumination is at its maximum and regenerated a few hours afterwards.

† See also Berthold (Pringsheim's Jahrb. f. Wiss. Bot. xiii.) on absence of chromatophores from the epidermal cells of Marine Algæ.

In this Stöhr is quite at variance with De Bary, who speaks of such epidermal chlorophyll grains as he was acquainted with "eventually" containing starch. I carefully passed 50 species in review with the object of reaching the truth of this matter, and found that in no less than 17 of them the chlorophyll grains of the lower epidermis had a more or less plentiful supply of starch. The 17 were :—

Stellaria media.
Tropæolum canariense.
Phaseolus vulgaris.
P. multiflorus.
Bryonia dioica.
Cucurbita ovifera.
Bellis perennis.
Pyrethrum sinense.
Senecio vulgaris.
Primula vulgaris.
Petunia nyctaginiflora.
Solanum nigrum.
S. Dulcamara.
S. tuberosum.
Verbena chamædrifolia.
Mirabilis longiflora.
Urtica urens.

In 12 more evidence as to the presence of starch was far less satisfactory; nevertheless slight signs of assimilation were detected in them :—

Viola canina.
Hibiscus africanus.
Pelargonium zonale.
Oxalis Acetosella.
Circæa lutetiana.
Bidens tripartita.
Tagetes patula.
Chrysanthemnm Leucanthemnm
Helianthus annuus.
Digitalis purpurea.
Spinacia oleracea.
Mercurialis annua.

The remainder showed no trace of starch, *viz.* ;—

Nigella damascena.
Reseda odorata.
Dianthus barbatus.
Tropæolum majus.
Lathyrus odoratus.
Ribes nigrum.
R. rubrum.
R. Grossularia.
Godetia rubicunda.
Petroselinum sativum.
Campanula medium.
Pyrethrum Parthenium.
Chrysanthemum frutescens.
Centaurea Cyanus.
Helianthus tuberosus.
Dahlia sp.
Lactuca sativa.
Anagallis arvensis.
Borrago officinalis.
Mentha piperita.
Rheum undulatum.

After a short sojourn in darkness the starch is discharged from the grains, and they can be recharged on exposure to light. Thus of cut shoots of *Bryonia dioica* kept $3\frac{1}{2}$ days in the dark the epidermal grains showed their first trace of starch in good light in $1\frac{1}{2}$ hour, and it was well seen in $2\frac{1}{2}$ hours. If, however, the *Bryonia* was deprived of light for 6 days, starch did not make its appearance until between 3 and 4 hours. And since a careful examination has shown that starch-containing chlorophyll grains may exist in the epidermis of very young leaves, while on the other hand no starch can be discovered even in the oldest leaves of species in the starch-less list, the "eventuality" of the appearance of starch, testified to by De Bary, is not borne out by facts.

Assimilation appears to be more vigorous in the grains of the stomatal guard-cells than in that of the other epidermal elements, and this is the case even where, in the latter, the amount of assimilated material is greatest, as in *Bryonia dioica*, the *Solanaceæ*, and *Mirabilis longiflora:* nevertheless no traces of starch were detected in the guard-cells of *Lupinus hirsutus*, *Borrago officinalis*, and sometimes of *Anagallis arvensis*, and there were but faint hints of it in *Lactuca sativa*.

I have also observed that in very poor light assimilation does not take place in epidermal grains: this suggested the thought that perhaps the negative results had been obtained from plants examined early in the morning and after some days of dull weather, but re-trial of several types of the starchless list toward the close of a bright day showed that the suggestion was erroneous. It would be unsafe to assert that the capacity to yield the starch reaction is dependent upon the depth of the grains' colouring. It must be remembered, however, that in dealing with small bodies like the grains, in some cases scattered at wide intervals over the cell-wall, in others packed more or less closely thereupon, precise comparison as to grades of colour is very difficult. Still the fact that in one type the starch reaction can be readily obtained, while in another, with apparently quite as deeply-tinted chlorophyll, no marks of assimilation are visible, does seem to teach that assimilation is mainly dependent upon some factor other than chlorophyll, and so tends to the indirect support of Pringsheim's theory.

Most of the types of the assimilation list yielded tannin in their epidermis, although in a few cases, if tannin were present, the quantity was too small to make itself evident by ordinary micro-chemical means. Of the first section of this list *Bryonia dioica*, of the second section *Phaseolus vulgaris* and *Verbena chamædrifolia*, of the third *Ribes nigrum*, *R. rubrum*, and *Godetia rubicunda*, have in place of ordinary tannin a substance taking with iodine a blue or purple colour; it gives the tannin reaction with iron salts, but neither with potassium bichromate alone, nor with the addition of iron salts and Millon's reagent, does this occur: moreover, like tannin, it remains unaltered in the cells of dead leaves; it thus resembles precisely the substance discovered in the epidermal cells af certain monocotyledons (*Arum*, *Gagea*, *Ornithogalum*, spp.) by Kraus and others, and in a small per-centage of examined districts. I have found it in greatest force in *Bryonia dioica;* if a piece of this plant's epidermis be mounted in weak iodine, a beautiful blue colour declares itself in all the cells. Weak iodine should always be preferred in testing for this body, which Kraus nevertheless thinks to be tannin, because, in a feebly alkaline fluid, a weak solution of iodine gives with tannin colours similar to those produced in the epidermal cells.* Whether this idea be well-founded it is difficult to say; an alternative view is that the substance in question, although not tannin, is a closely related member of the tannin series.

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* Dufour (Bull. Soc. Vaud. d. Sc. Nat. 1886; abstracted in Bot. Ztg. 1886, p. 869) has found this "soluble starch"—which he regards as a carbohydrate—**only in about 20 types out of 1300 examined.**

The foregoing statements may be thus epitomised :—

(i.) As Stöhr has shown, all but a small percentage of Dicotyledons have chlorophyll in their epidermis ; but in about half of them chlorophyll is found on the upper surface as well.

(ii.) Etiolin is formed in them as in other chlorophylligerous cells.

(iii.) In a considerable number (34 per cent.) of species with epidermal chlorophyll grains starch can be easily detected therein ; whereas in 24 per cent. a small quantity of starch is discoverable. Only 42 per cent. have absolutely starchless grains.

(iv.) There is no eventuality in the appearance of the starch, as De Bary states, for on the one hand the grains can easily be discharged of and recharged with starch, which, on the other hand, is absent from the grains of some types throughout life.

(v.) In any given case it is impossible to say *à priori* from the apparent depth of colouring shown by epidermal chlorophyll grains whether starch will or will not be found therein : this seems to support Pringsheim's theory of assimilation.

(vi.) The substance blueing with iodine and showing the tannin reaction with iron salts may perhaps be not tannin, but closely related thereto.

NOTES ON MIDDLESEX PLANTS.

By John Benbow, F.L.S.

A concluding visit this summer to two or three districts of the county resulted in finding several plants which had been previously overlooked. Although none of them probably call for special notice, as a supplement to former lists the following may be mentioned :—

**Fumaria muralis*. Still to be found on hedge-banks about Teddington and Hampton Wick, but in every instance closely surrounded by the builder.

Teesdalia nudicaulis. Whitton Park inclosure.

Viola sylvatica var. *Reichenbachiana*. Sparingly by the Brent near Hanwell. (This form seems to be remarkably scarce in Middlesex).

Rosa spinosissima. A group of three or four bushes in a rough furzy spot by Hounslow Heath. The authors of the 'Flora' observe that they did not meet with this species in Middlesex, but Mr. Castle appears to have gathered it somewhere in the neighbourhood about 1835. I am unable to identify *Rosa villosa* in any of the stations recorded for it. All the specimens collected by me in Mr. Lees' stations about Apperton, Perivale, &c., are *tomentosa*, as are also Mr. Newbould's records from the same district. Dr. Hind's stations prove equally unproductive. At Greenhill, near the Harrow station, I can discern neither species; and about

Roxeth only a few bushes of *tomentosa*. If *villosa* is to be found in either of these two places it must be very scarce. (My own previous record of this species was a clerical error, the specimen being correctly labelled "*tomentosa*.")—*R. systyla* I found to be rather common in hedgerows about Harrow station.

Myriophyllum alterniflorum. Pond on High Hill near Edgeware.

Aster Tripolium. Isle of Dogs in many places; in one spot abundant and very luxuriant. The old ditch by the timber dock has been filled up; *Petroselium segetum*, *Samolus Valerandi*, and other species formerly growing beside it, are consequently lost. There is still a marshy hollow at the southern end of the Milwall Docks, where I gathered *Carex divisa* and *Rumex palustris*, but this is also being gradually filled in, and a few more truck-loads of earth will soon bury both out of sight. (In the same way *Angelica Archangelica* has been lost at Sandy End, Fulham.)

Senecio viscosus. Isle of Dogs profusely. Lane at Greenford Green abundantly.

Onopordum Acanthium. Several plants in the hedgerow of a sandy field at Chiswick.

Carduus arvensis var. *setosus*. Isle of Dogs. Hanwell. Chiswick. This plant has quite the appearance of a native in sandy fields about Chiswick.

Crepis taraxacifolia. Thames bank near Barnes Bridge, opposite the osier-beds. After many careful searches, I can see no trace of Mr. Melvill's *Myosotis repens* "in ditches at Pinner Drive," nor does it *now* seem at all a likely place in which to find it.

**Verbascum nigrum*. Thames bank about Chiswick. A single plant of *Mentha rubra* was found in the ditch near Harrow station, where I failed to discover it last year. Being annually cut down to the roots in early summer it is easily overlooked and difficult to obtain in bloom. I have not observed this species elsewhere in the county, though it is not uncommon just over our bounds in Bucks.

Salix pentandra. Old trees at Swakeley, near Uxbridge; of course originally planted.—*S. Forbyana*. By the Brent near Hanwell.—*S. Smithiana* is by no means the "very rare" species it is represented to be. It is abundant on the margins of all the brooks flowing from Pinner, Ruislip, Harrow and Roxeth, towards Ickenham, Uxbridge and Yedding; in the meadows adjoining these water-courses; and in lanes and hedges throughout the district. In the Colne Valley, about Harefield and Springwell Moors. On the Brent about Whetstone. Nether Court near Finchley. And a single tree below Perivale Church. Forms of distinctly different habit (*S. ferruginea* ?) grow by Belmont Pond, Uxbridge Common, and in a hedge by canal near Harefield Moor lock.

Myrica Gale. A single bush on Hampstead Heath. The authors of the 'Flora' state that they included this species with some hesitation, although recorded from "Colbrooke" in 1597 by Gerard, and from "Hunslow Heath" in 1666 by Merrett. This hesitation was based upon the fact that it is not found in either Herts, Essex, or Buckinghamshire; but they allow that its occurrence in Surrey, on Bagshot Heath, "much lessens the

improbability of its former occurrence in the similar district of Hounslow Heath." The probability that Merrett's record was correct is consequently much increased by this re-discovery of the plant; indeed, the peculiarities of the plant itself are so marked that it is difficult to understand how either he or Gerard could be mistaken.

Habenaria bifolia. Scratch Wood, near Edgeware.

Neottia Nidus-avis. Middlesex side of Mims Wood.

Epipactis media. Middlesex side of Mims Wood, in several places.

Convallaria majalis. A large patch in Winchmore Hill Wood.

Allium vineale. Thames bank between Richmond Bridge and Twickenham.

Scirpus maritimus.—*S. triquetrum.*—*S. carinatus.* Abundant from "The Mall" above Hammersmith Bridge to Strand on the Green and Brentford Ferry. These stations are higher up the river than those given in the 'Flora.' (Is *carinatus* specifically distinct from *lacustris?* In almost every specimen collected, however contiguous, I invariably find nuts with *three* stigmas.)

Carex axillaris. Abundant in a lane near Edgeware, towards Edgewarebury.

Avena pubescens. Plentiful in the meadows south of Richmond Bridge. Mr. Newbould's "*Avena pratensis*" was not met with. It is singular Mr. Newbould did not record *pubescens* also, seeing at that time it was not known to be a native of Middlesex.

Koeleria cristata. Horsington Hill; abundantly with *Genista tinctoria.* Horsington Wood no longer exists; it has been entirely grubbed up and the ground converted into meadow land. All Mr. Lee's numerous records from this station are therefore lost.

Casuals and aliens seem largely on the increase. A few of those met with may be noticed—

Melilotus parviflora. Canal side near Harefield Moor. Isle of Dogs.

Medicago falcata. Isle of Dogs. This plant has long been established on Uxbridge Common.

Centaurea Jacea. Waste ground near Chiswick; two plants. Isle of Dogs in many places, apparently quite established.

Stachys annua. Sandy fields, Chiswick. Isle of Dogs. *Reseda lutea* and *Echium vulgare* are also plentiful in the latter station, but can hardly be considered natives there.

Reviewing results, it is impossible to shut one's eyes to the fact that a serious diminution in the number of species has taken place since the issue of Messrs. Trimen and Dyer's 'Flora.'

Doubtless a few of those retained in that volume were already extinct at the date of publication. However that may be, it is certain that many species collected by the authors themselves have since that period gradually died out, One instance out of many that could be cited may be given.

Only twenty years ago, *Lycopodium inundatum* and *Radiola linoides* were gathered by them on Harefield Common, the former "rather plentifully," the latter "abundantly." Both

species (with several others then extant) have long since disappeared.

Such plants as *Herniaria glabra*, *Arnoseris pusilla*, *Centunculus minimus*, &c., I have given up in despair, though long sustained in the quest by the hopeful assurance of the authors that they "are likely to be refound." Possibly they may be, but my own experience fosters the belief that in the meanwhile others are far more likely to be missing than those to be refound. In fact, should the present rate of loss continue, twenty years hence it will not require a very bulky volume in which to record the then existing Flora of Middlesex.

NOTES ON THE BOTANY OF SELBORNE.

By the Rev. John Vaughan, M.A.

This paper was originally written with a view to its appearing among the 'Proceedings' of the Hants Field Club; but that intention, owing to want of funds, has been abandoned. I venture to think, however, that the following notes may not be without interest to those—and they are many—who venerate the name of Gilbert White, and to whom the neighbourhood of Selborne is classic ground.

I have not thought it necessary to give a complete list of the local flora. It has rather been my desire to mention the rarer and more interesting species, and some of those not noted in Townsend's 'Flora of Hants.' This locality is situated in district X. of that work; but that district also includes the country around Headley and Liphook, with which I am only slightly acquainted. My notes therefore will be chiefly confined to the more immediate neighbourhood of Selborne and Alton.

Some of the plants mentioned by Gilbert White, and by the late Mr. Bell in his edition of White's 'Selborne,' have not been met with of late years. All the plants in the following list have been seen, either by myself or by some competent botanist, growing in the localities indicated, within the last four or five years.

An asterisk denotes that the plant has not been recorded for district X. in Townsend's 'Flora.'

Helleborus viridis L. Grows in abundance in a copse in Bentworth parish. Near Old Park Farm, Chawton. Not found of late years in White's locality at Selborne.—*H. fœtidus* L. Selborne Hanger. Becoming scarce, owing to its being taken up for sale by dealers.

Aquilegia vulgaris L. Nore Hill, Selborne.

**Fumaria Boræi* Jord. Cultivated ground, Alton, 1887. — **F. confusa* Jord. Cultivated ground, Alton, 1887. — **F. micrantha* Lag. Cultivated ground, Alton, 1884.

Erysimum cheiranthoides L. On June 11th, 1885, I found several

stunted specimens on the sandy heath near Oakhanger Chapel. Kingsley, several fine plants, July 27th, 1887.

Nasturtium palustre DC. Shortheath.

Arabis perfoliata Lam. In considerable quantity on a hedge-bank between Worldham and Kingsley, not far from Lode Farm. This is evidently the plant intended under the name *A. Turrita* in Townsend's 'Flora.'

Teesdalia nudicaulis Br. Plentiful on Shortheath. Wolmer Forest.

**Reseda lutea* L., and **R. luteola* L. Alton; common.

Viola palustris L. Bin's Pond, Selborne.

Saponaria officinalis L. Selborne, *Rev. E. R. Bernard.* One plant near 'The Hen and Chickens'; Froyl, 1886.

**Geranium columbinum* L. Alton. — *G. pratense* L. Selborne, *Rev. E. R. Bernard.* Kingsley, July, 1887.

**Genista tinctoria* L. King John's Hill, E. Worldham.

**Melilotus officinalis* L. Cultivated fields in parish of E. Worldham, *G. Turvill.* Alton, 1887.

**Anthyllis vulneraria* L. Alton.

**Trifolium subterraneum* L. Shortheath.

Astragalus glycyphyllus L. Monk Wood, Alton; abundant.

**Vicia tetrasperma* Mœnch. Alton.

Lathyrus Nissolia L. Bushy places about King John's Hill, Worldham, *G. Turvill.*—*L. sylvestris.* The Lyth (where it grew in White's time); and at Temple, Selborne.

**Potentilla argentea* L. Hedge-bank, near Lode Farm, Kingsley. —*P. Comarum* Nestl. Forest, near Liss, June 9th, 1884. Not found of late years in Gilbert White's locality, in the bogs of Bin's Pond, Selborne.

**Geum rivale* L. For some years I have known one or two plants in Amery Wood, Alton. I have never found it elsewhere in the district.

**Sedum Telephium* L. Hanger at E. Worldham. Long Copse, Selborne.

**Saxifraga tridactylites* L. Walls at Alton, West Tisted; and other places.

Viscum album L. Thedden; rare.

Dipsacus pilosus L. E. Worldham Hanger. Selborne. Roadside, Chawton; and in several other localities.

**Silybum Marianum* Gaert. Weed in a garden at Alton.

Gnaphalium sylvaticum L. Abundant in Chawton Park. Akender Wood; and one or two other places.

Erigeron acris L. Plentiful on Holyborne Down; and on Amery Down, Alton.

**Cichorium Intybus* L. Alton, 1885; rare.

**Helmintha echioides* Gaertn. In considerable plenty, in several copses at E. Worldham.

Vaccinium Oxycoccos L. On June 4th, 1886, I found this beautiful plant on boggy ground at Shortheath, Gilbert White's locality.

**Pyrola minor* L. One small patch in a plantation in the parish

of Alton, where I have known it for three or four years. One plant, and one plant only, was found by Miss Nicholson, in a copse at Basing Park, on July 17th, 1885.

Monotropa Hypopitys L. Plentiful on Selborne Hanger, 1886. Chawton Park, 1883.

Chlora perfoliata L. Outside Monk Wood, and at the foot of Amery Down, Alton.

Gentiana Amarella L. Common on Holyborne Down, and Amery Down, Alton. Selborne.

Menyanthes trifoliata L. Between the Mills, Alton. Forest near Liss.

**Cuscuta Trifolii* Bab. Unusually abundant in 1884 and 1885.

Atropa Belladonna L. Plentiful in an old pit at E. Worldham. Copse at Rotherfield, *Rev. F. Howlett.*

**Hyoscyamus niger* L. One plant at Alton in 1884; and one plant in a yard at Selborne in 1885.

Verbascum nigrum L. Very common. One of the most characteristic plants of the district.

Digitalis purpurea L. Abundant in several woods about Alton.

**Linaria Cymbalaria* Mill. Common on walls.—*L. Elatina* Mill. E. Worldham; uncommon. — *L. spuria* Mill. Abundant in cornfields about Selborne and Alton.

Lathræa Squamaria L. This plant grows in one or two copses at Alton. There is also a large patch of it in the orchard at Will Hall, Alton, where it was originally transplanted from a neighbouring wood many years ago, by the late Mr. Tirrel Gunner. The Vicarage garden at Newton Valance. Not seen of late years at Selborne, in White's locality.

Marrubium vulgare L. Shortheath, July, 1887.

Leonurus Cardiaca L. Near Oakhanger Chapel, Selborne, July, 1887. This is probably White's old locality, "Forest-side."

**Pulmonaria officinalis* L. Copse at the foot of E. Worldham Hill.

Lithospermum officinale L. Copses, Alton; not common. — *L. arvense* L. Occasionally in cultivated fields about Alton.

Cynoglossum officinale L. Oakhanger, near the chapel, and at other spots.

Polygonum Bistorta L. Abundant in a damp meadow between the Church and the Priory, Selborne. — *P. minus* Huds. Shortheath.

Euphorbia platyphylla L. One plant; Alton, July, 1884. — **E Cyparissias* L. There is a large patch of this plant in a new plantation near the Warren Farm, Shalden. The seed was probably introduced with the young trees.

**Sparganium simplex* Huds. Shortheath, 1887.

Orchis pyramidalis L. Outside Monk Wood, Alton. Nore Hill; and other places. — *O. latifolia* L. Abundant between the Water-mills, Alton. I cannot satisfactorily distinguish this plant from *O. incarnata* L.

Habenaria conopsea Benth. Nore Hill, Selborne.—*H. bifolia* and *H. chlorantha* Bab. Both fairly common in the woods about Alton.

Ophrys apifera Huds. Great Wood, Alton; some years in plenty. Orchard at Chawton House.—*O. muscifera* Huds. In one or two places outside Akender Wood, Alton; but very sparingly, and becoming scarcer. Nore Hill, Selborne.

Spiranthes autumnalis Rich. Abundant on Amery Down, Alton, and on Holyborne Down. Meadow at E. Worldham.

Neottia Nidus-avis Rich. Generally distributed. Alice Holt. Thedden. Akender. Great Wood, Alton. Selborne.

Cephalanthera ensifolia Rich. Copse at Bentworth, in fair abundance. Newton Valence. Now extinct, I believe, on Selborne Hill.—*C. grandiflora* Bab. Generally distributed and common.

Epipactis latifolia Sw. Selborne Hanger. Copses about Alton. —*E. media* Bab. Chawton Park. Akender. Alton.—*E. purpurata* Sm. Bushy ground on the top of Selborne Hanger. Not uncommon about Thedden. It is difficult satisfactorily to distinguish these two varieties of *E. latifolia* Sw. I sent a specimen from the Selborne locality to the British Museum at S. Kensington, which was pronounced to be the true *E. purpurata*, attention being directed to the purple stems, and especially to the very long bracts. It was added, however, that *E. purpurata* could not be considered a true species, hardly even a distinct variety; both *E. purpurata* and *E. media* being forms of *E. latifolia*.

**Iris Pseudacorus* L. Abundant.

Narcissus Pseudo-narcissus L. E. Worldham Hanger; abundant.

Galanthus nivalis L. Long Copse, Selborne.

Paris quadrifolia L. Generally distributed throughout the district.

**Allium vineale* L. Amery Down, Alton.

Narthecium Ossifragum Huds. Wolmer Forest.

Scirpus sylvaticus L. Kingsley, 1887.

Asplenium Trichomanes L. One or two plants on north wall of Alton Church in 1883: since disappeared.

Ophioglossum vulgatum L. Abundant in one spot in Thedden Park. Meadow at E. Worldham.

Lycopodium inundatum L. Shortheath, Selborne; abundant.

The following plants are recorded for this district in the late Professor Bell's edition of White's 'Selborne,' published in 1877. I have not met with any of them. Some, no doubt, merely require confirmation; but others I fear are extinct.

Myosurus minimus L. Hollow Lane, Selborne.

Cuscuta europæa L. "Bean's Bog," *G. White*.

Bartsia viscosa L. The Lithe, Selborne.

Sibthorpia europæa L. Short Lithe, Selborne. This must surely be a mistake.

Mentha sylvestris L. Selborne.

Pulmonaria angustifolia L. "Hollow Lanes," Selborne. This is given on Gilbert White's authority. Might not this plant, as Mr. Townsend suggests, have been *P. officinalis*, which does occur in the neighbourhood.?

Melissa officinalis L. "Dorton by the stream," Selborne. Dr. Bromfield found this plant at Selborne in 1848.

Nepeta Cataria L. "Northfield," *Gil. White.*

Daphne Mezereum L. This plant must now, I fear, be considered extinct on Selborne Hanger.

Aceras anthropophora R. Br. "Nore Hill," Selborne; said to have been once found there.

Allium oleraceum L. "Park at the Wakes," Selborne.

Tulipa sylvestris L. "Park," Selborne. Not now growing there; transplanted into the garden some years ago.

Osmunda regalis L. Ditch at Oakhanger.

Botrychium Lunaria Sw. "S. end of Common," Selborne. Has not been seen for many year.

On the authority of Dr. Tate (1866), *Lathyrus Aphaca* L., and *Calamintha Nepeta* Clairv., are recorded in Townsend's 'Flora' as occurring at Selborne. The last is surely a mistake. The former is not now growing there. *Trigonella ornithopodioides* DC., is also recorded for "commons near Kingsley," on the authority of the 'Pamplin MS.' I have never met with it.

In August, 1871, Mr. Wickham, of Binstead Wyck, found *Dianthus Armeria* L., growing on a bank near Marsh House, Bentley. Unfortunately this plant has not been seen since. *Erigeron canadensis* L., has once been found at Binstead Wyck some years ago.

About fifteen years ago, Lord Selborne tells me, he met with *Parnassia palustris* L., at Oakhanger, near Selborne (see Townsend's 'Flora,' p. 143). This plant has, strange to say, not been found since, though the boggy ground of the Forest is well suited to it, and it occurs in the neighbouring counties of Dorset, Wilts, Berks, and Surrey. At some future time, I hope I may be able to chronicle the re-discovery of this interesting species and to confirm many of the doubtful plants which now unfortunately have been lost sight of for many years.

ON *RANUNCULUS FLAMMULA.*

By W. H. Beeby, A.L.S.

When in Shetland last year, I gathered, by Littlesetter Loch, Yell, a very extreme rooting form of this plant, which was named by Dr. Lange var. *radicans* Nolte; this name I understand to be an earlier one for the plant called var. *pseudo-reptans* Syme. At first I was myself in doubt whether this plant should be referred to *R. Flammula* or to "*reptans*," and in Mr. C. Bailey's paper on the "Forms and Allies of *Ranunculus Flammula*" (*ante*, p. 137), he speaks of it as agreeing well with one of his lake forms, "so near the true *reptans*, that a careful botanist has great difficulty, even on the spot, in assigning a name to individual plants." I brought home living roots of this plant, and grew them at Reigate in gritty

and stony soil similar to that in which they grew by the loch-side, and the pot was always kept standing in water. Nevertheless, within two months they had entirely reverted to typical *Flammula* so far as the root-leaves were concerned; and the following spring (1887) the reversion to type was completed by their sending up tall erect flowering stems, the whole plant then differing in no respect from ordinary *Flammula*. The common erect plant is very prone to root even at the upper nodes, and will do so when growing in a ditch dry at bottom, but containing much dank grass, as at Hedge Court, Surrey (1886); or when accidentally trodden down, as in a swampy place on Wimbledon Common (1887); I think, therefore, that it is tolerably clear that these rooting plants are none of them varieties, but merely most ephemeral states resulting from local influences.

Such floating forms as occur in Surrey seem also to be only states. It is by no means unusual in this county to find, in the early spring months, floating states in which the root-leaves are very different from those of the land plant; the lamina being triangular ovate, often somewhat subcordate at the base, rarely more than half longer than broad, and from seven to ten times shorter than the petiole. As in the case of the large *Batrachium*-like floating leaves of *R. sceleratus*, also to be seen by our Surrey ditch-sides in the early spring, they rarely persist until the flowering season, owing, I suppose, to the ditches and pools frequently becoming dry by that time. Typical *Flammula* seems to fruit well in Surrey.

Respecting *R. reptans* L., Fries wrote ('Novitiæ,' p. 173) that "*R. reptans* L. verissimus!" when transplanted to the garden, reverted the first year to *R. Flammula*. But in a later work ('Summa,' p. 142) he follows Koch in treating it as a distinct species on the fruit characters; remarking, however, that he has seen similar abortive fruits in *R. Flammula*. No allusion is made to his previous observation, and I suppose it may be fairly concluded that he imagined that he had not experimented on the true plant. Even at the present day the question whether *R. reptans* L. be a distinct species or not would seem to be undecided, judging by the different treatment it receives from different authors. It is treated as a distinct species by Professor Babington ('Man. Brit. Bot.'); by Dr. Blytt ('Norges Flora'); by Dr. Lange ('Danske Flora,' 'Consp. Flo. Groenl.') and by Dr. Nyman ('Consp. Flo. Europ.'); as a subspecies by Dr. Boswell Syme ('Eng. Bot.' iii.), and by Sir J. Hooker ('Stud. Flo.'); and finally, as a variety by Dr. Hartman ('Flo. Scand.'); by Professor Macoun ('Cat. Canad. Pl.'); and by Dr. Hjalmar Nilsson according to his labels (worded "*Ranunculus Flammula* L., *β. reptans* (L.)! var. *radicans* (Nolte)" accompanying examples which I possess by the kindness of Mr. Arthur Bennett. Dr. Nilsson also draws attention to the short obtusish beak to the fruit of his plant, which is, I may add, the most strongly-marked "*reptans*" that one could wish to see. In order to show the present discordant opinions about this plant it has been necessary to go into some amount of detail. But the

question is not merely one of variety or species, it is one of myth or entity; for should "*reptans*" be found to revert at once to *Flammula*, as at one time supposed by Fries, it can scarcely be regarded as more than a state, though truly a marvellous one, of that plant; should it, however, maintain its characters in cultivation, it would, I think, now have to be admitted a good species. The simple experiment of growing the plant for a year would probably decide the point. Will not some of our northern friends get living roots of the Loch Leven plant, and set this question at rest once and for all?

SHORT NOTES.

Potamogeton rufescens Schrad. (1815). — Mr. B. D. Jackson (p. 335) prints a note from Mr. Druce, suggesting an older name for this species, *P. alpinus* Balb. (1804), Mr. Druce giving as his authority "Nyman and Syme." This name is used by Dr. Ascherson, in his admirable 'Flora of Brandenburg,' for *rufescens;* but Bellardi, in the same year, published what is quite as much *rufescens* as *alpinus* (neither being the typical form), under the name of *P. annulatus*. It may be worth giving a list of some of the names under which this species has appeared :—

P. alpinus Balbis ! (1804).
P. annulatus Bellardi ! (1804).
P. obscurum DC. (1805).
P. purpurescens Seidel (1812).
P. semipellucidus Koch. et Ziz. ! (1814).
P. rufescens Schrad. (1815).
P. obtusus Du Croz ! (1818).
P. fluitans Smith ! (1828).
P. nervergerus Wolf. ! 1830.
P. microstachys Wolf. ! 1830 ?
P. retusum Smith MS. !
P. lanceolatus Du Croz ! (Herb. Nolte, Mus. Brit.)
P. serratum Roth.
P. lucens Lagasca !

The first two names apply to local forms of the species. Why DeCandolle's name has been passed over I cannot say, if really referring to it; but I have seen no specimens. *P. purpurescens* Seidel, would be passed over as only published by Fieber in 1838; but *semipellucidus* clearly represents *rufescens*, and is one year earlier. But when the 'London Catalogue' was issued I did not care to introduce a name quite strange to British botanists, instead of one used almost universally. Although placed under *rufescens*, it is not here intended to deny that there are differences between such plants as *P. nervergerus* and *microstachys* of Wolfgang, and the usual form of *rufescens*. Indeed, it is a matter for surprise that *rufescens*, considering its great range of variation, has not been split into many so-called species; *crispus*, with a much less range of variation, had nine so-called species made out of it, by a well-known "splitting" botanist, one of which is founded on a piece of stem and two leaves ! Mr. Druce asks (p. 349), "Why not restore . . . *Potamogeton compressus*, *gramineus*, &c. ?" I reply, for the best of reasons: that they are without meaning, may apply either

to two or three species, and that the herbarium of Linnæus does not decide how they are to be applied. As to his descriptions when applied to specimens so named, it is simply the opinion of the writer who uses them, not of Linnæus, who did not know them. For example, one specimen named "*compressum*, an verum? nequaquam," noted by Sir J. E. Smith as "*complanatum* Willd." (our *zosterifolius*) is a narrow-leaved form of *heterophyllus* Schreb.! Another named "*gramineum*?" noted in pencil by Sir J. E. Smith "*cuspidatum*," is *zosterifolius*. Another "an *P. compressum*." "Brit. Fl. et Herb. Cliffort," added by Sir J. E. Smith, is *P. Friesii* Rup. (*mucronatus* auct.). Mr. Bentham (Fl. Austral. vii. 173) writes, "The Linnean names, *P. gramineus* and *P. compressus*, have been so variously applied to this and the following species, as well as to the varieties of some of the heterophyllous species with the leaves all submerged, and the species were so vaguely defined by Linnæus himself, that they cannot now be satisfactorily identified, and I have followed most modern authors in taking up the species at first correctly defined by German botanists, and suppressing entirely the Linnean names." And in this view I entirely concur.—Arthur Bennett.

Apiocystis Brauniana Näg.—I have only just seen Mr. Alfred W. Bennett's memoir on North Cornwall Algæ (Journ. Roy. Micros. Soc. 1887, p. 8), wherein it is stated that *Apiocystis Brauniana* Näg. "appears to have been detected in this country only once before, by Henfrey, as long ago as 1856." If this be correct, it may be not without interest to mention that I distinctly remember to have seen this alga a few years ago, two or three times: being then resident at Lewisham the habitat was, in all probability—though at this distance of time certainty is out of the question—some pond in that neighbourhood. On one occasion I was fortunate enough to see the zoospores, which were just as figured in the books. The type should be looked for in the London district, where indeed it was originally found by Henfrey. Its re-discovery in Cornwall seems to promise a wide distribution in this country.—Spencer Moore.

Rhynchospora fusca R. et S., in Scotland,—Mr. J. McAndrew has sent me specimens of the above species, from a moor in Kirkcudbrightshire, gathered in 1882, and remaining without a name until the present time. Though a southern and western species in England, it occurs in the south of Norway, "along the coast to Molde," and in Sweden to about 60° N. latitude, which takes it far above the south of Scotland, especially as the lines of temperature rise on approaching Scotland. It also occurs in Denmark; so there is no antecedent reason why it should not occur in Scotland from the distribution point. Formerly reported from Yorkshire and Salop, though I believe its most northern English station is Cardigan.—Arthur Bennett.

Cerastium arcticum Lange, in Carnarvon.—In August, 1886, I gathered upon one of the precipices of Snowdon, a *Cerastium* which I thought to be *C. latifolium* Sm. Some of the specimens were

forwarded by Mr. A. Bennett to Dr. Lange, whose reply was, "*C. arcticum* Lange, cum foliis angustioribus." We thus, as Mr. Bennett points out, possess this plant in Shetland, Scotland, and Wales. The *Cerastium* was growing in fair plenty, at an altitude of about 3000 feet, or somewhat higher. It is no doubt the same plant as has been previously reported from Snowdon under the name of *C. latifolium*.—Augustin Ley.

Thalictrum alpinum L., in Kerry.—I found this plant in the Brandon range of mountains, on rocks facing east, at an altitude of about 2000 feet, in August this year. I now learn, on consulting the 'Cybele Hibernica,' that it is new to the South of Ireland. There was not very much of it, and I only saw it at a single spot during two days' rambling upon the mountain.—Augustin Ley.

A new Lycopodium from Ecuador.—We have just received from Mr. R. V. Sherring, F.L.S., a very curious new *Lycopodium*, allied to *L. clavatum*, in which the leaves are membranous, except at the very base, and entirely destitute of chlorophyll. It was gathered by Anton Hubsch at Mataba, in the Province of Loxa, in the Andes of Ecuador, in August, 1883.

Lycopodium albidum, n. sp. — Main stem wide-trailing, hypogœous; lower branches erect, 6–8 in. long, bearing about 5 closely-adpressed branchlets. Leaves lanceolate, ¼ in. long, closely imbricated, white and membranous, except at the very base, fimbriate-dentate on the margin. Spikes not seen. — Should be placed after 82 in my Synopsis, next to *L. vestitum* Desv. (*L. scariosum* Hook. Ic. t. 89, non Forst.).—J. G. Baker.

Juncus tenuis Willd. in Kirkcudbrightshire.—In September last I sent Mr. Arthur Bennett, Croydon, a rush which he pronounced to be *Juncus tenuis* Willd., one of George Don's reputed discoveries. I found it growing on the roadside, among other rushes and grasses, about sixty yards from a house which stands by the same road-side. If not indigenous, I cannot see how this rush could have come there. Its station is West Risk, a mile and three-quarters west of New Galloway, Kirkcudbrightshire, Scotland.—James McAndrew.

NOTICES OF BOOKS.

Comparative Morphology and Biology of the Fungi, Mycetozoa, and Bacteria. By A. de Bary. Translated by Henry E. F. Garnsey, M.A. Oxford, Clarendon Press, 1887. 8vo, pp. xviii. 525.

The publication by the Clarendon Press of a translation of Prof. de Bary's 'Vergleichende Morphologie' is one of those events one has come to expect in the natural course of things. In the admirably selected series of German botanical works which has issued in English form from the Press there is none likely to have a greater and better influence on the progress of Botany in this

country. Mycology has always been eagerly studied among us, but, with a few prominent exceptions, the students of it have not done brilliant things, to say the least. Nor is this all. This country has been the stronghold of obstinate and unreasoning conservatism, shown in the clinging to exploded views and the resisting of new discoveries on no other intelligible grounds than their novelty. It is only fair to say that the influence of that school has gone. A dozen years ago, for example, there were a few voices crying in the wilderness on behalf of Schwendener's discovery of the dual nature of the lichen-thallus. Now it would be hard indeed to find a teacher of botany—or an unfossilised botanist for the matter of that—who does not accept it.

This volume is in little more than name a new edition of the author's 'Morphologie und Physiologie der Pilze, Flechten und Myxomyceten.' The eighteen years that elapsed between the publication of the former book and the present one in its German form did so much for mycology that a new book in plan and in contents became a necessity. It is needless to say here how carefully, conscientiously, and with what judgment the task has been accomplished. Even those who have most stubbornly attacked the views on particular points of Prof. de Bary are ready to acknowledge that he of all men is best fitted for so great a work as the construction of a trustworthy general treatise out of so enormous a mass of material as was contributed during those eighteen years of research. It is difficult to convey anything like an adequate idea of the extent and the conflicting nature of the literature dealt with.

In the first chapter the histological characteristics are described; in the second the differentiation of the thallus into mycelium and sporophore; while the third deals with the spores, their development and dispersal, structure and germination. The fourth chapter begins Division II., and is devoted to introductory considerations with regard to the course of development of Fungi, the question of terminology, and the basis of classification. The classification known as Sachs's is dismissed, and the author's now well-known system established in consequence of these considerations. In many respects this is the most remarkable chapter in the book. In the next (V.) the groups of Fungi are passed in comparative review at great length. The chapter in fact consists of 210 pages. Chapters VI. and VII. constitute Division III., and are devoted to the mode of life of Fungi—the former dealing with the phenomena of germination, and the latter with the phenomena of vegetation (including lichen-forming fungi).

The second part of the book treats of the *Mycetozoa*, their morphology and course of development, and their mode of life; while the third part similarly treats of the *Bacteria*.

Mr. Garnsey has carefully done the work of translation, which has had the advantage of Prof. Balfour's revision. The book is uniform in appearance with the others of the series issued by the Clarendon Press, and in every way worthily printed and got up.

Lectures on the Physiology of Plants. By Julius von Sachs. Translated by H. Marshall Ward, M.A., F.L.S. Oxford, Clarendon Press, 1887. 8vo, pp. xiv. 836.

It will be remembered that, instead of producing a fifth edition of his 'Lehrbuch der Botanik,' Prof. Sachs wisely resolved to divide the field covered by it, and leaving Prof. Goebel to compile the systematic portion as a separate book, 'Grundzüge,' &c. (which has appeared in English form as 'Outlines of Classification and Special Morphology,' see Journ. Bot. 1887, p. 90), he undertook himself that portion more particularly his own. To this, for the sake of advantage in exposition, he gave the form of lectures (Vorlesungen über Pflanzen-physiologie), and the book now under notice is a translation of it by Prof. Marshall Ward. He could not have been more fortunate in a translator it is scarcely necessary to say, since the qualifications Prof. Ward has brought to the work are well known to all readers. It therefore only remains to give in outline an idea of the scope and plan of the Lectures, which are forty-six in number. The first part (Lectures I.—XI.) deals with organography, and the most striking feature of the treatment of the matter is the departure from the customary mode of view and the division of the body of the more highly-developed plants into two groups of organs, "root and shoot." This abandonment of morphological considerations doubtless has its conveniences from the purely physiological point of view; but it can hardly be said to be judicious in a scheme of general botanical instruction, and the root and shoot system will probably do more harm than good in the long run. Part II. is devoted to the external conditions of vegetable-life and the properties of plants; Part III. to nutrition, and Part IV. to growth; while irritability and reproduction are respectively dealt with in V. and VI. No more excellent, exhaustive, and thoroughly well and clearly-written treatise on plant physiology is to be found in any language, naturally excepting the author's own original German book, though this is no disparagement of Prof. Ward's admirable rendering of it. Prof. Ward has constructed a new index, which is in all respects what an index should be, its most useful feature being the references in larger type to illustrations.

A Manual of Orchidaceous Plants cultivated under glass in Great Britain. Part I. *Odontoglossum.* Pp. 80. James Veitch & Sons, 544, King's Road, Chelsea. 1887. 8vo, pp. 80 [Price not stated].

This is the first of a series of handbooks, uniform with the well-known 'Manual of Coniferæ' by the same authors, destined for the use of amateur orchid growers. The authors have done well to commence with a genus of which almost every species is well worthy of cultivation, and which therefore is one of the most popular of all. The manual opens with a short general account of the genus, some interesting remarks on the geographical distribution illustrated by two coloured maps, and some cultural notes. Then follows a synopsis of the commonly cultivated species,

with plenty of woodcuts of the flowers. It would have been better, we cannot help thinking, to have arranged the species in any way but the alphabetical order, the only advantages of which can be equally well attained by an index. If arrangement in a natural order were impracticable, and indeed it would present certain difficulties, owing to the number of hybrids or probable hybrids in cultivation whose place would be uncertain, a geographical arrangement would be most useful. Perhaps some modification in the design of the work in this direction might be made in the remaining parts promised by the author.

Among the Odontoglots there are a considerable number of forms, either natural hybrids or varieties, which have received names as species. Wherever the authors have been able to do so they have grouped all these garden species under one specific name, and so condensed the nomenclature. In this they have simplified the synonymy considerably, and that without mixing up really distinct species. The book will be found very useful to amateurs and dealers, and we hope that the other parts in course of publication, which are to contain the genera *Cattleya*, *Lælia*, *Dendrobium*, and *Cypripedium*, may be equal to the present volume.

H. N. Ridley.

New Books. — W. Detmer, 'Das Pflanzenphysiologische Praktikum' (Jena, Fischer, "1880": 8vo, pp. xvi. 352: 131 cuts).—G. Haberlandt, 'Ueber die Beziehungen zwischen Function & Lage des Zellkernes bei den Pflanzen' (Jena, Fischer: 8vo, pp. viii. 135: tt. 2).—A. Ortmann, 'Flora Hennebergica' (Weimar, Böhlan: 8vo, pp. vii. 151).—H. Lee, 'The Vegetable Lamb of Tartary' (Sampson Low: 8vo, pp. xi. 112). — A. Denasyer, 'Les Bactéries Schizomycètes' (Bruxelles: 8vo, pp. xviii. 40: 1 plate). — A. Béchamp, 'La Théorie du Microzyma et le système microbien' (Paris, Baillière, "1888": 8vo, pp. xxxviii. 495). — B. Riomet, 'Essai sur la Flore du Canton de Rozoy-sur-Serre' (Péronne, Quentin: 8vo, pp. 38).—D. Dietrich, 'Forstflora' (ed. vi. O. F. von Thümen: Dresden, Baensch: 4to, vol. i. pp. xvii. 146).—V. Loret, 'La Flore Pharaonique' (Paris, Baillière: 8vo, pp. 64).

Articles in Journals.

Bot. Centralblatt. (Nos. 44–47). — P. Dietel, 'Beiträge zur Morphologie und Biologie der Uredineen.' — (No. 48). R. Keller, 'Bildungsabweichungen der Blüten angiospermer Pflanzen.'

Bot. Gazette (Oct.).—J. M. Coulter & J. N. Rose, 'Development of the Umbellifer fruit' (1 plate).—O. Robertson, 'Insect relations of certain Asclepiads.'—F. W. Anderson, 'Indicative Eriogonums.'

Botaniska Notiser (häft. 5).—G. Lagerheim, 'Algologiska Bidrag' (*Cosmarium subpyriforme*, n. sp. — A. N. Lundström, 'Om mycodomatier på papilionaceernas rötter.' — K. Starbäck, 'Bidrag till Sveriges Ascomycetflora.' — V. B. Wittrock, 'Några bidrag till Kännedomen om *Trapa natans*.'—S. Almquist, 'Om gruppendelning

inom fam. *Rosaceæ*.'—O. Juel, '*Mycenastrum Corium*.' — N. H. Nilsson, 'Ofversigt af de skandinaviska arterna af slägtet *Rumex* och deras hybrider: *R. maritimus* och *R. palustris*.'

Bot. Zeitung (Nov. 4).— C. Wehrner, 'Ueber das Verhalten der Formose zu entstärkten Pflanzenzellen.'—(Nov. 11, 18). H. Hoffmann, 'Culturversuche uber Variation (*Primula* and *Prunella*).'—(Nov. 18). W. Johannsen, 'Ueber Fortdaner der "Athmungs Oxydation" nach dem Tode.'

Bull. Soc. Bot. France (xxxiv. Comptes rendus 5: Nov. 1).— A. Chatin, *Tuber uncinatum*, n. sp. — P. van Tieghem, 'Réseau sus-endodermique de la racine des Caprifoliacées.'— —. Boulay, 'Flore tertiare des environs de Privas (Ardèche).' — A. Franchet, '*Rhododendron* du Yun-nan' (7 new species). — A. Chatin, 'Flore Montagnarde.' — L. Petit, 'Des faisceaux libéro-ligneux dans le pétiole des Juglandées, &c.' — A. Daguillon, 'Exemplaire monstreux de *Ricinus communis*.'

Bull. Torrey Bot. Club (Aug.). — S. Watson, '*Echinocystis*, *Megarrhiza*, and *Echinopepon*.' — W. E. Safford, 'Flora of Banda Oriental.' — E. L. Greene, 'Bibliographical Notes on *Myosurus*.'— A. G. Apgar, '*Aralia nudicaulis* var. *prolifera*, n. var.' — (Sept.). E. L. Greene, 'Bibliographical Notes on *Nymphæa* and *Nuphar*.' F. M. Lyon, 'Dehiscence of Sporangium of *Adiantum pedatum*.'— (Oct.). T. F. Allen, 'Notes on *Characeæ*' (*Nitella Muthnatæ*, n. sp., 1 plate; *N. Morongii*, n. sp., 1 plate; *Tolypella Macounii*, n. sp., 2 plates). — E. L. Greene, 'Bibliographical Notes on *Nelumbo* and *Nemacaulis*.' — (Nov.). E. L. Greene, 'Bibliographical Notes on *Gleditschia* and *Amarantus*.'—Asa Gray, 'Annotations' (on *Nelumbo* and *Nemacaulis*).—T. Meehan, '*Sherardia arvensis*.'

Flora (Oct. 1, 21).—E. Immisch, 'Zur Entwicklungsgeschichte der Spaltöffnungen' (1 plate). — (Oct. 1). C. Müller, *Aulacopilum Balansæ*, *Erpodium Hodgkinsoniæ*, *E. Balansæ*, *E. Schimperi*, spp. nn. — (Oct. 11). J. Velenovsky, 'Morphologische Beobachtungen' (1 plate).— —. Eggerth, *Platysma ochrocarpum*, n. sp.—(Nov. 1, 21). R. Diez, 'Ueber die Knospenlage der Laubblatter' (1 plate).— H. G. Reichenbach, *Paphinia Lindeniana*, n. sp.

Gardeners' Chronicle (Nov. 5). — *Angræcum calligerum* Rchb. f., n. sp. — (Nov. 12). W. G. Smith, 'Nomenclature of Fungi.'— M. T. Masters, 'Germination of Cyclamens' (fig. 117).—(Nov. 19). *Peristeria læta* Rchb. f., sp. n. — W. B. Hemsley, 'The Botanical Magazine' (concluded).— (Nov. 26). *Dendrobium Friedericksianum* Rchb. f., n. sp.

Journal de Botanique (Nov. 1). — H. Lecomte, 'Effets produits par la décortication annulaire des arbres.'—A. Franchet, 'Le genre *Cyananthus*' (*C. macrocalyx*, *C. longiflorus*. spp. nn.). — P. Hariot, 'Les Cladoniées magellaniques' (*C. cupulifera* Wainio MSS., *C. flavescens* Wainio MSS., spp. nn.). — (Nov. 15). P. van Tieghem, '*Oleina* et *Podocapsa*, deux genres nouveaux des Ascomycetes.'— E. Roze, 'Mode de fécondation du *Zannichellia palustris*.' — E. Wasserzug, 'Principaux procédés de coloration des Bacteriées.'

Notarisia (Oct.). — E. Perroncito & L. Varalda, 'Intorno alle così dette Muffe delle Terme di Valdieri, nota preventiva.' — E. Martel, 'Contribuzioni all' algologia italiana.'

Oesterr. Bot. Zeitschrift (Nov.).—O. Stapf, 'Ueber einige Iris-Arten des bot. Gartens in Wien.' — M. v. Eichenfeld, '*Cirsium Przybylskii*' (*oleraceum* × *pauciflorum*).— B. Blocki, '*Rosa Hedevigæ*, n. sp.'—P. Conrath, 'Zur Flora von Bosnien.'

Trans. Linn. Soc. London (2nd ser. ii.: October). — D. Oliver, 'Plants collected by H. H. Johnston in Kilima-njaro Expedition, 1884' (*Urvaria leptoclada*, *Cardamine Johnstoni*, *Hypericum Kiboense*, *Zizyphus pubescens*, *Trifolium Johnstoni*, *Rubus dictyophyllus*, *Alchemilla argyrophylla*, *A. Johnstoni*, *Begonia Johnstoni*, *Pentas longiflora*, *Hedyotis Johnstoni*, *Psychotria hirtella*, *Vernonia Wakefieldii*, *V. stenolepis*, *Helichrysum Kilimanjari*, *Senecio Johnstoni* (t. 60), *Gazania diffusa* (t. 61), *Gomphocarpus bisacculatus*, *Gymneura parvifolium*, *Ipomæa bullata* (t. 62), *Cuscuta Kilimanjari*, *Streptocarpus montanus*, *Isoglossa laxa*, *Anisotes parvifolius*, *Clerodendron Johnstoni*, *Plectranthus parvus*, *Psilotrichum africanum*, *Arthroselen latifolius*, *Pilea Johnstoni*, all of Oliver; *Acidanthera laxiflora*, *Gladiolus pauciflorus*, *G. sulphureus*, *Scilla Johnstoni*, *Aloe Johnstoni* (t. 63), *Anthericum venulosum*, *A. rubellum*, *Asplenium loxoscaphoides*, *A. sertularioides*, *Mohria vestita*, all of Baker; *Selago Johnstoni* Rolfe.).

LINNEAN SOCIETY OF LONDON.

November 3, 1887. — W. Carruthers, F.R.S., President, in the chair. — Mr. J. H. Hart, of Trinidad, was elected a Fellow of the Society. — The President called attention to the death-roll since the June Meeting, specially deploring the loss of Prof. Julius von Haast, N. Z., Dr. Spencer Baird, U. S., and Prof. Caspary, of Königsberg.—Mr. Henry N. Ridley gave an account of his Natural History collection in Fernando Noronha. The group of islands in question is in the S. Atlantic, 194 miles E. of Cape San Roque. The largest is about five miles long and two miles across at broadest part. Although chiefly basaltic, phonolite rocks crop up here and there. The island is very fertile. Owing to the destruction of the forests for firewood, &c., the indigenous flora has been very much altered in character; nevertheless several endemic species were obtained. Among the cryptogams got were a common species of fern, a few mosses and hepatics, several lichens, and some fungi. The flowers of the "Burra," an Euphorbiaceous tree mentioned by many previous voyagers to the island, were found for the first time; and a drawing of probably new species of *Erythrina* was exhibited. Fruits of a curious *Solanum* (*S. corniculum*), used in medicine by the Brazilians, were also exhibited. — Mr. George Murray exhibited specimens of *Valonia ovalis* Ag,, from Bermuda, collected by Mrs. Whelpdale, and from Grenada, collected by himself. The specimens from Bermuda, consisting each of a single cell, were always of a

balloon-shape, and attained a longest diameter of upwards of an inch, while the greatest girth exceeded two inches. The Grenada specimens were considerably larger, and either spherical or oval in shape—agreeing in this respect with specimens from Guadaloupe in the British Museum. There was possibly a specific difference between them. Mr. Murray then gave an account, illustrated with diagrams, of the development of *Valonia utricularis* Ag., as described by Nägeli, incidentally comparing that observed in *Sciadium*. He also exhibited under the microscope the germ cells of *V. ovalis* obtained from the Grenada specimens, but stated that he had not been able to obtain their further development. Prof. H. Marshall Ward exhibited specimens and made remarks on the peculiar development of *Agaricus* (*Armillaria*) *melleus*.—Mr. E. A. Heath showed some well-preserved examples of fruits of two species of *Solanum* from Barbadoes.—A paper was read, "On the scars occurring on the stem of *Dammara robusta*," by Mr. Samuel G. Shattock. From the author's observations it may be gathered that the process of disarticulation of the branches is like that by which a leaf or other organ is shed. The parenchymatous cells across the whole zone of articulation multiply by transverse division, a layer of cork resulting from the formation of this secondary meristem, and through the distal limits of this solution of continuity occurs. After this the slender connecting bond of wood is broken across by the weight of the branch or the first trivial violence; this completion of the process being aided, perhaps, by the tension made upon the wood in consequence of the cell-division of the surrounding parenchyma which occurs across its axis. It thus happens that the whole of the parenchymatous system of the stem is closed *before* the branch is actually shed.—A communication followed by Messrs. J. G. Baker and C. B. Clarke, being a Supplementary Note on the Ferns of Northern India to the latter author's Memoir already published in the Society's 'Transactions.'

November 17.—Prof. St. George J. Mivart, F.R.S., Vice-President, in the chair.—Mr. Arthur Bennett drew attention to the following new British plants: *Arabis alpina* L., *Juncus alpinus* Vill., and *J. tenuis* Willd.—Mr. W. H. Beeby exhibited and made remarks on *Carex cæspitosa* (L.) Fr., from Shetland.—Photographs of a branched palm, *Borassus flabelliformis*, were exhibited for Surgeon-General G. Bidie, of Madras, and a letter thereon read. The tree is growing about eight miles from Tangiore, near a village named Pallucottah, and is remarkable in being divided into eight branches. He mentions also having seen a flower-spike of a cocoanut-palm in which one of the flower-buds had developed into a small leaf.—Mr. Thos. Christy exhibited seed-pods of a species of *Strophanthus* (*S. hispidus?*) with brown velvety seeds and intensely bitter taste, obtained recently from the Niger. Another variety with small light-coloured seeds, grown in Mauritius, lent from Madagascar, was also shown.—Mr. D. Morris, F.L.S., exhibited—(1) a fibre exported from Vera Cruz to the value of nearly £60,000, under the name of Broom Root. This was a new article of industry, and investigations carried on at Kew proved that Broom Root was simply the wiry root-fibres of

one or more species of grass belonging to the genus *Epicampes*; one species, viz., *E. macroura* Benth., was undoubtedly used. The local name is Zacaton, and hence the fibre is known amongst the Mexicans as Raviz de Zacaton. (2) A Mexican fibre or Ixtli, largely used in this country in the manufacture of nail-brushes, dandy-brushes, &c. The origin of this fibre has for a long time been obscure. Dr. Perry contributed to the Kew Museums in 1879 fibre and brushes made from it, said to be derived from *Agave Sechiquilla* Torrey. This species is identical with *A. Poselgerii* Salmdyck, and *A. heteracantha* Zucc. A careful examination of the fibre derived from living plants at Kew of *A. heteracantha* has established its identity with Mexican fibre or Ixtli. The fibre is short, very tough and rigid, and is evidently well adapted for use in the place of animal bristles. — A paper was read by Mr. Patrick Geddes, "On Certain Factors of Variation in Plants and Animals" (Part I. Plants). The following is a summary of the memoir: (1) Starting from the origin of a flower as a shortened branch, it is evident that this cannot be attributed to natural selection, since the apparent alternative of lengthening cannot exist, vegetation being checked by reproduction. But the same explanation holds good (2) of the shortening of the inflorescence from raceme through spike or umbel to capitulum or even fig, (3) of the shortening of the axis within the flower itself, giving the transition from hypogyny through perigyny to epigyny, (4) of the reduction and coherence of the floral enveloper, (5) of the reduction of stamens, (6) of carpels, (7) of ovules. But these constitute the leading modifications of the flower, and the essential characters of the natural order are then seen to be continuously developed as a consequence of vegetative subordination and reproductive preponderance; natural selection furnishing more frequently the check to evolutionary change than the impulse or aid to it. Floral colour, too, is seen to have arisen in the same way, the reds and yellows of flowers, as of spring and autumn foliage, being simply the imperfect as vegetation of immaturity, reproduction, and decline respectively. The tendency to its accumulation is primarily associated with the progressive shortening of the axis for reproduction, although here a certain measure of acceleration through rational selection, *i.e.*, by aid of insects, is not derived. An examination of floral details shows many of the most peculiar "adaptations" to be more simply interpretable in terms of the characters of the leaves of which they are the checked equivalents, *e.g.*., not only the pinnate sepals of the rose, or the swollen leaves of the styles of *Umbelliferæ*, from their characteristic leaf-cases, but even the tailed stamens and cupped stigma of violet or the springing fruit of geranium. Passing next to the variation of plants under domestication, we find their apparent indefiniteness cleared up by the application of the same principle: thus, the many and well-marked variations of cabbage (kale to cauliflower) arrange themselves in a single series and are seen to represent only so many stages along a single groove of change. The apparently obvious and generally accepted origin of spring plants through the natural selection of browsing mammals

is not verified by a re-examination of the evidence, for many of those forms are uneatable to begin with, or often occur in regions, *e.g.* New Zealand, where there have been no browsing mammals to attack them. The real explanation of the origin of species is to be found in soil and climate on the one hand, and in a more or less distinct ebbing of the vegetative activities back from the growing-point; after the first few weeks of spring they in fact express a constitutional vegetative disadvantage. The origin of sex of monœcious and dicecious plants is next interpreted, and the paper concludes with an application of the same principle to the classification of plants. As among monocotyledons we find the central liliaceous type specialising into the supreme floral orchid on the one hand, or into the typically vegetative grass on the other, so it is with all other alliances, each in some degree exhibiting types of vegetative or more reproductive preponderance. This may be traced through orders, genera, or even species and varieties; larkspur and meadow rue represent respectively these extremes among *Ranunculaceæ*, or the subspecies *Quercus sessiliflora* and *pedunculata* among our British oaks. In this way the origin of species as of their structural details comes primarily to be explained by reference to that oscillating equilibrium of the essential functions of individual and reproductive life; modification by descent is seen to take place along a definite line or groove of change within which the action of natural selection can at best somewhat accelerate its journey, when it does not actually retard or terminate it.

OBITUARY.

We regret to record the death of Hampden Gledstanes Glasspoole, which took place somewhat suddenly, at Hammersmith, on the 5th of March last. Mr. Glasspoole was borne at Ormsby St. Michael, Norfolk, on the 6th of April, 1825. His life was quiet and uneventful, but was marked throughout by the fondness for various branches of natural history which was characteristic of the "naturalist" of the old school. Botany attracted most of his attention, and it is in connection with British plants that his name and presence were most generally familiar. He published many papers in 'Science Gossip' on fruit-trees and other subjects, treated from a popular standpoint. His name appears occasionally in our own pages, to which (1878, p. 378) he contributed two short notes; he is mentioned by Mr. Arthur Bennett (1884, 125), in connection with the finding of *Carex trinervis* in England; and the British Museum Herbarium contains several Diatoms and other plants contributed by him. A new diatom, *Chætoceras armatum*, was described and figured in Trans. Microscop. Soc. for 1860 (viii. 151), from specimens found by Mr. Glasspoole. He was an original member of the Norfolk and Norwich Naturalists' Society, and contributed to its 'Transactions' two papers: a "Memoir of Lilly Wigg," and "Biographical Memoirs of some Norwich botanists."

Quiet, unobtrusive, and retiring, Mr. Glasspoole never occupied a prominent position among British botanists; but his readiness to help, and his kindly and gentle manner, will be missed by the many who knew him.

Dr. Albert Kellogg, the well-known botanist of California, died in Alameda, in that State, on the 31st of March, at the age of seventy-four. He was born in New Hartford, Conn., and went to California in the early years of the great migration to the Pacific coast. He soon abandoned his professional work and devoted himself to the investigation of the botany of California, with which he has been identified for over thirty years. He was one of the founders of the California Academy of Sciences, and in the 'Proceedings' and 'Bulletin' of the Academy the results of his researches have appeared from time to time. He visited Alaska in 1867, as surgeon and botanist of the special expedition of that year, Prof. George Davidson being the scientific director. Dr. Kellogg's name fills a prominent place in all of the leading works relating to West North American botany. He was a man of singular genuineness and simplicity of character, as guileless as a child, and abounding in kindly spirit and goodwill towards all.—*Amer. Journ. Science*, June, 1887, p. 602.

The Rev. Kirby Trimmer was born at Poplar, Middlesex, Dec. 22nd, 1804. He was the grandson of Sara Trimmer, the well-known writer of children's books, whose maiden name was Kirby. He was educated at St. Alban Hall, Oxford (now absorbed in Merton College), Whateley being the Principal and John Henry Newman (the present Cardinal) and Hinds (afterwards Bishop of Norwich) Tutors. He graduated B.A. in 1828, and was ordained to the curacy of St. George Tombland, Norwich, of which church he was, in 1842, appointed Vicar, having held the curacies of Bunham Norton and Stanhoe between 1828 and the last-named date. He retained his living until shortly before his death, which took place on the 9th of October last; he was buried at Crostwich, near Norwich, where most of his family also lie. Mr. Trimmer was not much known to British botanists generally, either personally or by correspondence, but devoted himself throughout his long life to the investigation of Norfolk plants. His taste for botany, indeed, dated from his Oxford days: one who was with him at St. Alban Hall writes—"His love of plants and his pastoral duties took possession of his mind; in fact, I think he was never so entirely happy as when he was alone. His love of Nature seemed entirely confined to plants in their natural state; he showed no taste for their various combinations in beds, &c." In 1866 Mr. Trimmer's investigations took shape in the publication of a 'Flora of Norfolk,' which embodied the observations made in his earlier entries of Stanhoe and Burnham Westgate, with his more recent discoveries in other parts of the county. Although not what could be called a "critical" work, it bears evidence of much care, and is marked by an anxiety to give due credit to previous writers in the same field—an anxiety which is even more prominently displayed in the

'Supplement,' published in 1885, and noticed at p. 380 of this Journal for that year. The genus *Mentha* was Mr. Trimmer's especial study; his large collection of Norfolk forms is in the British Museum (Natural History): he also added *Potamogeton trichoides* to the British Flora. His devotion to his mother was a marked feature in his life; and it was a touching sight to see him, when quite an old man, drawing her about in a bath-chair, in the cathedral-close near his house.

Mr. Edwin Lees, F.L.S., the well-known Worcester botanist, died at Worcester, on the 21st October, at the advanced age of eighty-seven, and was buried on the 28th, at Rudock, near Tewkesbury, of which his friend the late Rev. W. S. Symonds was formerly Rector. Mr. Lees commenced life as a printer and stationer in Worcester. In 1828 he published, under the name of Ambrose Florence, a Strangers' Guide to the City and Cathedral, which contains "A Catalogue of Plants growing wild in the vicinity of Worcester," his first contribution to the botany of the county. In 1830 he contributed to Loudon's 'Magazine of Natural History' "A List of Plants on the Malvern Hills"; and in 1834 he prepared for the 'Illustrations of the Natural History of Worcestershire,' by the late Sir Charles Hastings, M.D., the catalogue of Worcestershire plants contained in the Appendix to that volume, which forms the basis of the Worcester list in Watson's 'New Botanists' Guide.' Mr. Lees gave up business in early life, and devoted himself entirely to the study and promotion of Natural History. In 1833 he was actively engaged in the foundation of the Worcester Natural History Society. In 1847 he founded the Worcestershire Naturalists' Club, and was elected its first president. In 1853 he assisted in the formation of the Malvern Club, of which he was a vice-president. He was an almost constant attendant at the meetings of these clubs, and a frequent contributor to their Transactions. In 1843 he published 'The Botany of the Malvern Hills,' which reached a second edition in 1852, and a third in 1868. In 1867 he published the "Botany of Worcestershire," prepared in great measure from observations made at the field meetings of the Worcester Club. He was also the author of the 'Botanical Looker-out,' the 'Pictures of Nature,' and other works; and of numerous contributions to the 'Phytologist' and various scientific journals. Mr. Lees was one of the earliest botanists who made a systematic study of the Rubi. Several new forms of this perplexing genus were named by him, and one, *Rubus Leesii*, was named after him by Professor Babington. Among his many accomplishments he was an excellent botanical artist. An enthusiast in natural history, he was unwearied in his endeavours to popularise the study among his neighbours. His pleasant face and his hearty and genial character will long be remembered by the circle of friends who had the pleasure of botanising in his society at the meetings of the field-clubs of the Midland Counties.
—W. Mathews.

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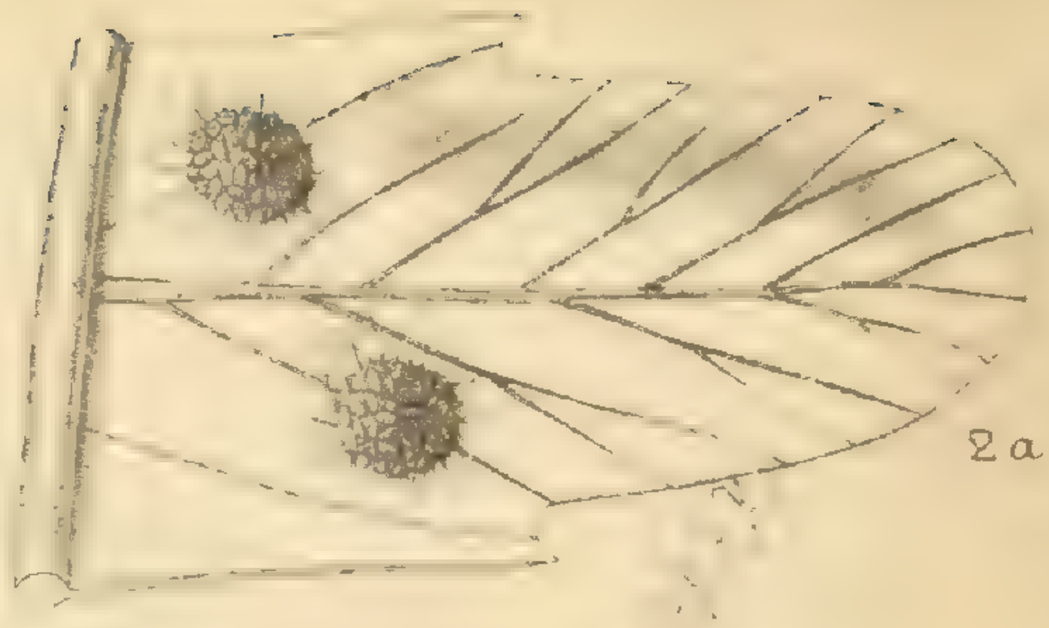

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